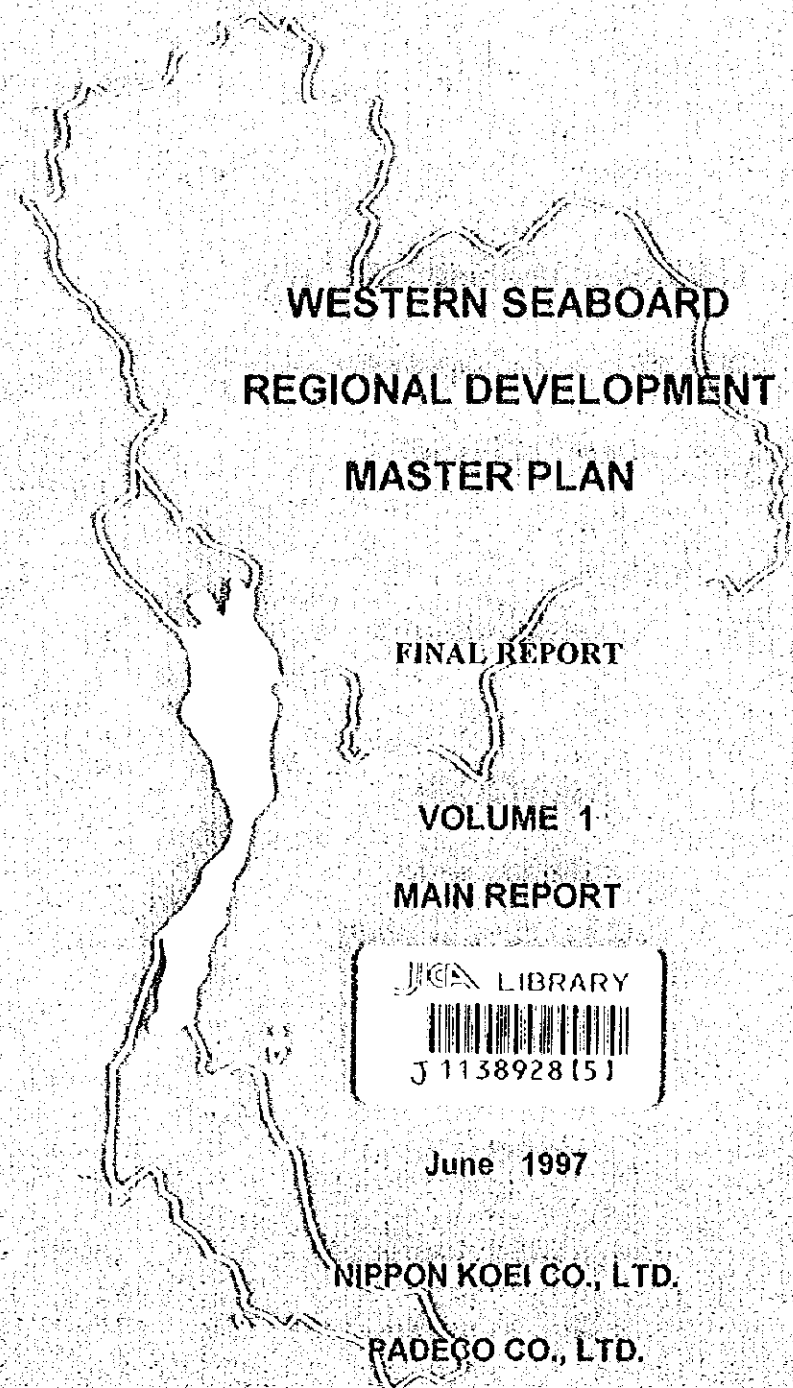


JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

NATIONAL ECONOMIC AND
SOCIAL DEVELOPMENT BOARD (NESDB)
OF THE KINGDOM OF THAILAND

WESTERN SEABOARD
MASTER PLAN
Volume 1
Main Report
June 1997




WESTERN SEABOARD
REGIONAL DEVELOPMENT
MASTER PLAN

FINAL REPORT

VOLUME 1

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JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

**NATIONAL ECONOMIC AND
SOCIAL DEVELOPMENT BOARD (NESDB)
OF THE KINGDOM OF THAILAND**

**WESTERN SEABOARD
REGIONAL DEVELOPMENT
MASTER PLAN**

FINAL REPORT

VOLUME 1

MAIN REPORT

June 1997

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LIST OF REPORTS

(This Volume is indicated by )

Executive Summary

Volume 1	Main Report
Volume 2	Social Environment
Volume 3	Macroeconomic Perspective
Volume 4	Spatial Development and Land Use
Volume 5	Rural and Urban Development
Volume 6	Agricultural Development
Volume 7	Industrial Development
Volume 8	Tourism Development
Volume 9	Infrastructure Development
Volume 10	Institutional Development



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Currency Equivalents

US\$ 1 = 25 Baht

1 Baht = US\$ 0.04

(As of Mid 1996)

PREFACE

In response to a request from the Government of the Kingdom of Thailand, the Government of Japan decided to conduct a study on the Western Seaboard Regional Development Master Plan Study and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA composed a study team headed by Mr. Hajime Koizumi, Nippon Koei Co., Ltd. and sent the study team to Thailand several times between February 1996 and March 1997.

The study team had a series of discussions with the officials concerned of the Government of the Kingdom of Thailand, and conducted necessary surveys at the study area. Through further studies in Japan, the present report was prepared.

I hope that this report will contribute to the promotion of the plan and to the enhancement of friendly relations between Thailand and Japan.

I wish to express my sincere appreciation to the officials concerned of the Government of the Kingdom of Thailand for their close cooperation extended to the study team.

June, 1997



President

Japan International Cooperation Agency

June, 1997

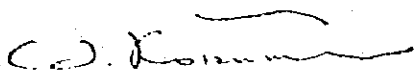
Mr. Kimio Fujita
President
Japan International Cooperation Agency (JICA)
Tokyo, Japan

Letter of Transmittal

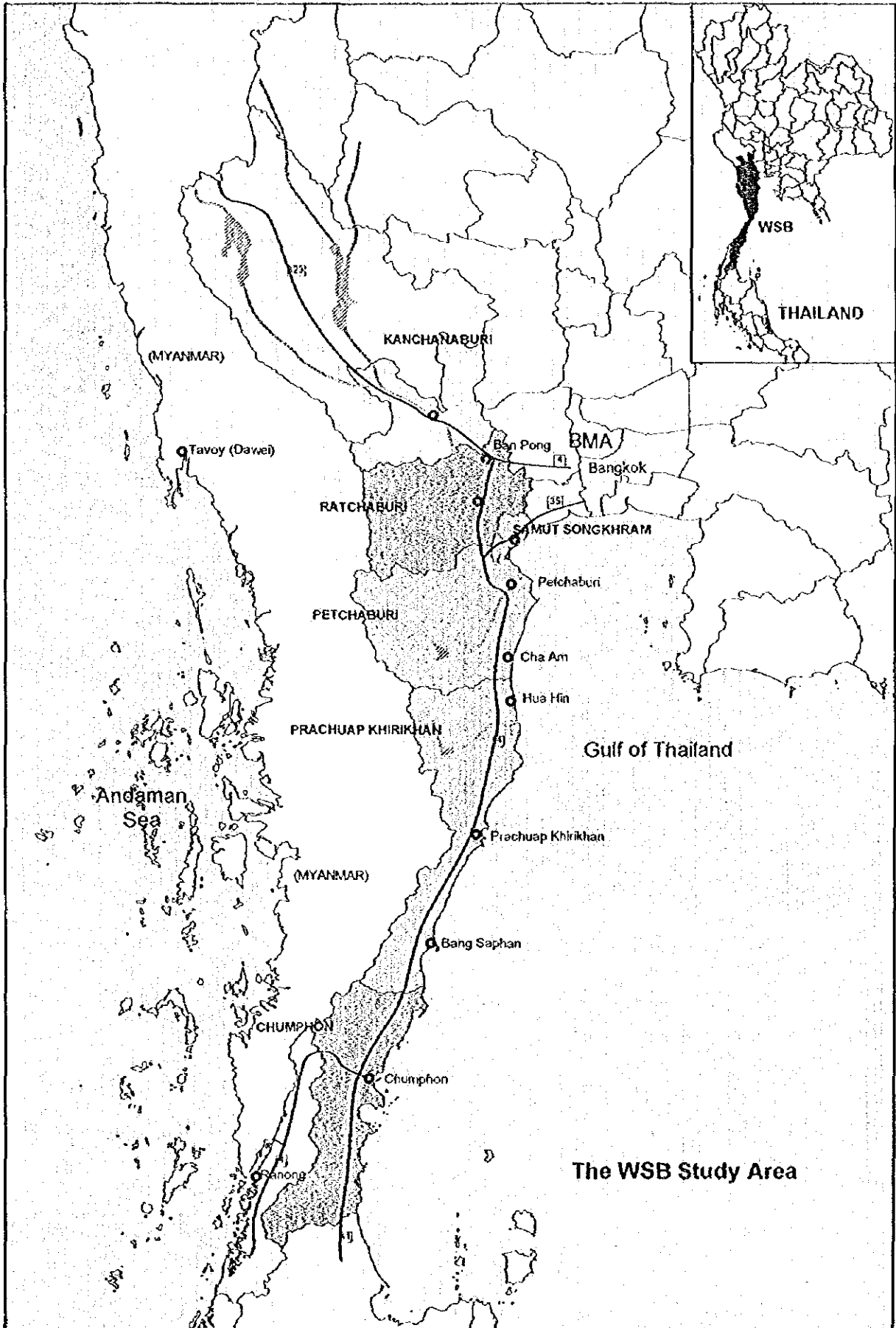
It is with great pleasure that we submit to you the Final Report of the Western Seaboard Regional Development Master Plan Study completed by our Study Team composed of experts from Nippon Koei Co., Ltd. and PADECO Co., Ltd., with cooperative efforts of NESDB and other Thai parties concerned. The Final Report presents the results of all investigations, analysis, planning, and studies undertaken for the integrated development of the Western Seaboard (WSB) region.

The WSB region is full of dreams and potentials for development. The WSB could become a leading region of Thailand, socially and economically, if adequate supportive measures are taken as proposed in this master plan study. Our Study Team hopes that the proposed master plan will be referred to in implementing the 8th National Economic and Social Development Plan (1997-2001) and the subsequent 9th and 10th Plans, and that it will guide the formulation and implementation of provincial and village (tambon) development plans in the WSB region.

Our Study Team would like to take this opportunity to express its heartfelt gratitude for the kind assistance and cooperation extended by the NESDB management team and counterpart experts, as well as by all other parties concerned, during the period of our study in Thailand from February 1996 to March 1997. Thanks to their excellent cooperation, our study has been completed efficiently and successfully.



Hajime Koizumi
Study Team Leader



VOLUME 1 MAIN REPORT

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Acronyms

ALRO	Agricultural Land Reform Office
ARD	Office of Accelerated Rural Development
BAAC	Bank for Agriculture and Agricultural Cooperatives
BOI	Office of the Board of Investment
CAT	Communications Authority of Thailand
CD	Customs Department
CDC	Central Development Center, NESDB
CLCO	Central Land Consolidation Office
DA	Department of Agriculture
DAE	Department of Agriculture Extension
DEDP	Department of Energy Development and Promotion
DEQP	Department of Environmental Quality Promotion
DIP	Department of Industrial Promotion
DLD	Department of Land Development
DOA	Department of Aviation
DOF	Department of Fisheries
DOH	Department of Highways
DOVE	Department of Vocational Education
DPO	Dairy Farming Promotion Organization of Thailand
DSD	Department of Skill Development
DTCP	Department of Town and Country Planning
DTEC	Department of Technical and Economic Cooperation
EGAT	Electricity Generating Authority of Thailand
FMO	Fish Marketing Organization
FTI	Federation of Thai Industries
GHB	The Government Housing Bank
GSB	The Government Savings Bank
HD	The Harbour Department
HPD	Highway Police Department of the Royal Thai Police
IEAT	Industrial Estate Authority of Thailand
IFCT	Industrial Finance Corporation of Thailand
LTD	Department of Land Transport
MEA	Metropolitan Electricity Authority
MOAC	Ministry of Agriculture and Cooperatives
MOC	Ministry of Commerce
MOE	Ministry of Education
MOF	Marketing Organization for Farmers
MOI	Ministry of Industry
MOI	Ministry of Interior
MOL	Ministry of Labour and Social Welfare
MOPH	Ministry of Public Health
MOSTE	Ministry of Science, Technology and Environment
MOTC	Ministry of Transport and Communications
MOUA	Ministry of University Affairs
NEPO	National Energy Policy Office
NESDB	Office of the National Economic and Social Development B

NFC	National Fertilizer Corporation
NHA	National Housing Authority
NRDC	National Rural Development Committee
NRDDC	National Rural Development and Decentralization Committ
NSO	National Statistical Office
NSTDA	National Science and Technology Development Agency
OAE	Office of Agricultural Economics
OEPP	Office of the Environment Policy and Planning
OPM	Office of the Prime Minister
PCD	Pollution Control Department
PEA	Provincial Electricity Authority
PTD	Post and Telegraph Department
PTT	Petroleum Authority of Thailand
PWA	Provincial Waterworks Authority
PWD	Public Works Department
RID	Royal Irrigation Department
RFD	Royal Forest Department
SEC	Securities and Exchange Commission
SRD	State Railway of Thailand
TAT	Tourism Authority of Thailand
TDRI	Thailand Development Research Institute
TOT	Telephone Organization of Thailand

Chapter 1 INTRODUCTION

1.1 Background of The Study

The Government of the Kingdom of Thailand has been promoting the social and economic development of the Kingdom, formulating integrated development plans by region, and the Government of Japan has cooperated in preparing master plans of the Eastern Seaboard, the Upper South, the Upper Central, and the Lower Northeast and Upper East Regions.

The Government of the Kingdom of Thailand requested technical cooperation to prepare a master plan for the development of the Western Seaboard (WSB) region, and the Government of Japan decided to extend such cooperation through the Japan International Cooperation Agency (JICA). In October 1995, JICA and the National Economic and Social Development Board (NESDB) discussed and agreed upon the scope of the WSB regional development study. The Study is expected to contribute to the achievement of sustainable development through harmonious socioeconomic and physical development within the Study area.

The Study was initiated by the Consultants contracted by JICA in January 1996. The Consultants have been studying WSB regional development in close cooperation with the NESDB's Management Team and Counterpart Experts.

1.2 Study Area

The area of the Study covers the six provinces of the WSB region, i.e., Kanchanaburi, Ratchaburi, Samut Songkhram, Petchaburi, Prachuap Khirikhan, and Chumphon, which have a total area of about 43,700 km². The Study Area faces the Gulf of Thailand to the east and the Union of Myanmar to the west; it extends for about 450 km from the north to the south.

The scope of the Study specified that the coverage of Kanchanaburi province would be limited to five districts (Muang Kanchanaburi, Tha Moka, Tha Muang, Phanom Thuan, and Huai Kra Chao) and one minor district (Dan Makham Tia). However, statistics at

the district level are rarely obtainable and therefore socioeconomic data for Kanchanaburi province presented in this study cover the whole province.

1.3 Study Objectives

The scope of the Study defines the objectives as follows:

- (i) To prepare an integrated regional development master plan for the WSB region, for the target year of 2011 (i.e., the end of the 10th Five-Year Plan period);
- (ii) To formulate institutional/organizational measures to facilitate project implementation;
- (iii) To recommend an action program including a package of priority projects and institutional/organizational measures that can be implemented during the 8th Five-Year Plan period (1997-2001); and
- (iv) To transfer technology related to development planning.

Objectives (i) and (ii) above have been pursued mainly in the first half of the study period up to September 1996, while objective (iii) has been pursued mainly in the latter half of the study period. Objective (iv) has been in principle pursued throughout the entire study period.

1.4 Execution of The Study

The JICA Study Team has been organized by experts of Nippon Koei Co., Ltd. and PADECO Co., Ltd. The Team also subcontracted and mobilized several Thai consultants to execute the Study in the most efficient manner. The members of the JICA Study Team and Thai consultants are listed in Table 1.01.

Since the commencement of the Study, the JICA Team has conducted various investigations and studies in close cooperation with NESDB's Management Team and Counterpart Experts. Further, NESDB organized a Steering Committee for the Study composed of representatives from various ministries, institutions, authorities and agencies. The members of NESDB's Team and the Steering Committee are listed in Table 1.02.

The Study has been carried out in steps. The inception works as well as analysis of the current situation were completed during Step 1 (from January to March 1996); the inception works were reported in the Inception Report and Discussion Paper (*Preliminary Concept of Development Scenarios*) that were submitted at the beginning of March 1996. During Steps 2 and 3 (from April to September 1996), development frameworks and scenarios were elaborated, and an integrated regional development master plan was formulated. The results of the studies in Steps 1 to 3 were presented in the Interim Report, and they were discussed at the Interim Technical Seminar held in October 1996. During Step 4 (from October 1996 to March 1997), the Study focused on the priority projects/programs. The Draft Final Report was submitted in February 1997, and discussions were held on it at the Draft Final Seminar in March 1997. Comments and observations presented at the Draft Final Seminar have been incorporated and reflected in this Final Report.

In the course of the Study, the JICA Team and the NESDB Management Team discussed the social and economic development of the WSB region with a wide range of individuals and organizations, including people in the central and local government, nongovernmental organizations, enterprise managers, villagers and village/community leaders, among others. To obtain opinions from an even wider sample and in a more systematic and rigorous way, the JICA Team carried out some interview and/or questionnaire surveys in the Study area under subcontracts. These surveys included:

- (i) Interviews with villagers, rural and urban residents, as well as governmental and nongovernmental organizations (240 interviews);
- (ii) Interviews for a social perceptions survey (120 interviews);
- (iii) Interviews with villagers and enterprises in the area where impacts of tourism development are expectable (100 interviews); and
- (iv) Questionnaire survey of existing enterprises (135 responses out of a sample size of 200).

The results of interview/questionnaire surveys have been analyzed and reflected in the plan formulation of this Study.

For the preparation of a map of current land use, a wide range of data and information have been collected by the members of the JICA Team and subcontracted institutes (i.e., the GIS Application Center of the Asian Institute of Technology and Siamtech Co., Ltd.), and they have been put into a database for GIS (Geographic Information System)

planning. This database and GIS have been utilized not only for the preparation of the map of current land use, but also for the formulation of the land use plan and for other planning purposes.

An intensive training course in GIS applications has been provided to NESDB staff and staff of the Rajabhat Institute, Petchaburi, so that they will be able to follow up the work in subsequent stages of WSB development planning, as well as in applications in other regional development studies. The training was executed at the GIS Application Center (GAC) of the Asian Institute of Technology during the August 5-23, 1996 period.

1.5 Report

This Final Report presents the results of studies in Step 1 (analysis of the existing conditions, constraints, and potential), Step 2 (preparation of development frameworks and scenarios), Step 3 (formulation of an integrated regional development master plan), Step 4 (study of priority projects/programs), and Step 5 (finalization of reports).

The Main Report (Volume 1) summarizes the all studies conducted. Chapter 2 of the Main Report presents the development objectives and basic strategies proposed for the development of the WSB region. The proposed development scenarios and frameworks are set out in Chapter 3. Specific plans for development of the social sector are presented in Chapter 4. In Chapter 5, rural and urban development is programmed and proposed. Specific plans for development by economic sector (agriculture, industry, and tourism) are discussed in Chapter 6. Resources management and the environment, as well as development of infrastructure, is analyzed and proposed in Chapter 7. The WSB regional development plan is set out in Chapter 8 in a summarized form. In Chapter 9, the priority projects/programs to be considered under the 8th Economic and Social Development Plan are proposed. Institutional development is discussed in Chapter 10. Finally, in Chapter 11 recommended actions to be taken by the parties concerned are summarized for easy reference.

The results of the studies in each sector are presented in Volumes 2 to 10 of this Final Report. The Report is composed of the following volumes:

Volume 1	Main Report
Volume 2	Social Environment
Volume 3	Macroeconomic Perspective
Volume 4	Spatial Development and Land Use
Volume 5	Rural and Urban Development
Volume 6	Agricultural Development
Volume 7	Industrial Development
Volume 8	Tourism Development
Volume 9	Infrastructure Development
Volume 10	Institutional Development

In addition, a Working Paper has been separately compiled to present the database and GIS application utilized in this Study.

Table 1.01 List of JICA Study Team Members

Position	Name	Consultants
JICA Team		
Team Leader	H. Koizumi	Nippon Koei
Macroeconomics/Finance	R. Niebuhr	PADECO
Institutional Development	T. Hashimoto	Nippon Koei
Social Development	K. Dobeta	Nippon Koei
Land Use Planning	A. Nakamura	PADECO
Agricultural Development	K. Mei	Nippon Koei
Fisheries Development	H. Yonesaka	Nippon Koei
Marketing	C. Kuranami	PADECO
Industrial Development	Y. Mano	Nippon Koei
Trade and Investment	S. Aoki	Nippon Koei
Urban Planning	M. Tanifuji	Nippon Koei
Tourism Development	S. Shimbo	Nippon Koei
Transport Development	B. Winston	PADECO
Water Resources/Irrigation	F. Matsumoto	Nippon Koei
Energy, Power/Telecom.	Y. Wang	Nippon Koei
Social Environment	T. Kelly	Nippon Koei
Public Health	S. Sasada	Nippon Koei
Environment	H. Kawashima	PADECO
Database and GIS	K. Seetharam	Nippon Koei
Coordinator	Y. Toyosu	Nippon Koei
Thai Consultants		
Institutional Expert	Chakrit Noranitipadungkarn,	SEATEC/BEST
Educational Expert	Uthai Dulyakasem,	SEATEC/BEST
Social Perceptions Survey	Nisa Xuto,	Chulalongkorn
Urban Planning	Paranee Sawasdirak,	SEATEC/BEST
Rural Development	Warin Wonghanchao,	ICN
Community Development	Suwit Piapong,	Rajabhat Institute
Environmental Expert	Narawan Burikul,	Rajabhat Institute
Environmental Expert	Omsin Apijit	SEATEC/BEST

Table 1.02 List of NESDB Personnel and Steering Committee Members

Position/Department	Name
Project Management, NESDB	
Project Director	Pairoj Suchinda
Deputy Project Director	Mani Sattayateva
Assistant Project Director	Nikon Karayasiri
Project Manager	Weera Sritranond
Assistant Project Manager	Theerapat Kaiyarit
Assistant Project Manager	Sommaik Pakdeechat
Assistant Project Manager	Sutthisak Pataramanawongse
Counterpart Experts, NESDB	
Agricultural Development	Potchana Auengpaibul
Rural Development	Suparat Manmin
Natural Resources Development	Ratanavadee N.
Industrial Development	Kanit Sangsubhan
Tourism Development	Athipat Bamroong
Urban and Land use Development	Chutinart Wongsuban
Transportation Development	Siran Bunyasiri
Port Development	Kriengsak Rabilwongse
Human Resources Development	Chet Boonpratuang
Education/Public Health Develop.	Suparat Manmin
Social Development	Sombat Chutinant
Rural Development Coordination	Kittisak Sinthuwanch
Steering Committee Members	
Department of Highway (DOH)	Bancha Wattanasintu
Public Works Department (PWD)	Rajatin Syamanonda
Habour Department	Pongsawan Jarudecha
Electricity Generating Authority of Thailand (EGAT)	Chanaphun Kridakorn
Department of Industrial Promotion	Sumonman Kalayasiri
Petroleum Authority of Thailand	Chitrapongse Kwangsukstith
Department of Town & Country Planning (DTCP)	Sa-nga Pokabutr

Position/Department	Name
Royal Irrigation Department (RID)	Chapoon Kamolratana
Department of Agriculture Extension Office of Environmental Policy and Planning (OEPP)	Niti Chitpakdee
Department of Aviation	Chartree Chueyprasit
Ministry of Interior	Tiva Kuldilokrat
Ministry of University Affairs	Somboon Suksamran
Board of Investment (BOI)	Papasawadee Wirakitti
Industrial Estate Authority of Thailand (IEAT)	Amara Pananond
Tourism Authority of Thailand (TAT)	Tasanee Sucharitwongsanont
Ministry of Education	Akkapol Pruksawan
Ministry of Public Health	Mandhana Sangkhakrishna Songpan Singhkaew

- (ii) To develop a stable society, strengthen family and community, support human development, improve the quality of life, and increase community participation in national development;
- (iii) To achieve balanced economic growth with stability, and open up opportunities for people to participate in and receive their fair share of benefits from growth;
- (iv) To utilize, preserve, and rehabilitate natural resources and the environment, so that economic and social development and the quality of life can be advanced; and
- (v) To reform the administrative system to increase opportunities for NGOs, the private sector, communities, and individuals to participate in national development.

It is anticipated that this human-centered and socially-oriented development will be pursued, in one way or another, not only during the 8th Plan period but in the subsequent periods of medium- and long-term development plans.

(2) "Thailand Vision 2020"

On the occasion of the fiftieth anniversary of His Majesty King Bhumibol Adulyadej's accession to the throne, the Royal Thai Government in May 1996 announced its "Thailand Vision 2020," indicating the direction of development for the next 25 years. The Vision aims at enhancing Thailand's role in the global economy and society. Key elements of the Vision are set out as follows:

Vision of Thai Society

- (i) All Thais will have full opportunity to develop themselves to their fullest potential, physically, spiritually, intellectually, economically, and socially. Every Thai will have good health, an inquisitive and creative mind, be full of moral spirit, and have stable character;
- (ii) All Thais will have a high quality of life, free from poverty with a proper balance between material and spiritual development, and be well aware of the importance of natural resources and the environment;
- (iii) All Thais will take full part in decision making and have full responsibility for their own and the public interest in every way including economic, social, as well as political development of the nation; and

Vision of Thai Economy

- (iv) The Thai economy will be based on creativity and the free market system with efficiency and fairness, be technologically advanced, and lead the world in areas of high competitiveness. The Thai economy will have sustainable and stable growth with a balance between natural resources and environmental conservation. Prosperity and benefits from development will be well spread to every part and region of the country.

For the human resource development strategy, the Vision noted specifically that the most critical issue will be the education system, which needs to be totally overhauled. The Vision also points out that a "social welfare and security system" should be established by promoting household and community strength. Concerning economic development strategy, the Vision puts emphasis on maximizing five competitive advantages, as follows:

- (i) Use of geo-strategic locational advantage to develop Thailand as an economic hub of the region;
- (ii) Promotion of sustainable development for export industries by developing human resources, creating incentives for technology transfer, raising research and development standards, and cooperating with neighboring countries, especially those in the Association of Southeast Asian Nations (ASEAN);
- (iii) Increase in international competitiveness, especially using core competencies in the agricultural sector to continue as a leading country in tropical agricultural production (e.g., of tropical fruit);
- (iv) Promotion as a center for the regional tourism industry; and
- (v) Use of the private sector as a main driving force for the economic expansion.

"Thailand Vision 2020," as well as the 8th Plan, is full of suggestions relevant in formulating an integrated regional development plan for the target year of 2011 (i.e., at the end of the 10th Plan period), and it has been referred to by the JICA Team in preparing the development frameworks, scenarios, and strategies for the WSB regional development master plan.

(3) National Spatial Development Framework

Economic and social development in the past has been promoted without a nationwide physical or spatial development plan. Since August 1995, however, NESDB has been studying to formulate "a spatial development framework of Thailand" with technical cooperation from the Government of Norway (NORAD). The missions of the spatial development plan formulation are:

- (i) To make significant progress towards equity of opportunities in terms of education, quality of life, and income/career, regardless of location in Thailand;
- (ii) To take measures to develop a spatial structure supportive of environmental quality, quality of life, and amenity in Thailand; and
- (iii) To be conducive to rapid restructuring of the Thai economy and its emergence as a developed country early in the 21st Century.

The spatial development frameworks have been drafted to promote "regionalization" of development and "regional economic restructuring" from the viewpoint of national economic and social development. Some development strategies are proposed for each region. For instance, conservation of amenity is more focused in the Central and Lower WSB, while industrialization is envisaged in the Upper WSB.

2.2 WSB Region

The physical, social and economic situation of the WSB region is summarized below so that the reader may better understand the characteristics of the WSB region.

(1) Natural Conditions

The WSB Study area has a total land area of about 43,700 km² (including the whole province of Kanchanaburi), corresponding to 8.5 per cent of the national land area. The WSB faces the Gulf of Thailand to the east, and Tenasserim Division of Myanmar¹ to the west. The coastline of the WSB along the Gulf of Thailand is approximately 559 km in length, or about 30 per cent of the Thai coastline along the Gulf.

¹ Now known in Myanmar as Tanintharyi Division.

The region is physically divided into the Upper, Central, and Lower WSB. The Upper WSB has relatively extensive land and abundant water resources, particularly along the Mae Klong river, which runs through the provinces of Kanchanaburi, Ratchaburi, and Samut Songkhram. The annual mean precipitation in Ratchaburi is about 1,100 mm. About 80 per cent of annual rainfall is concentrated in the wet season from May to October. In the Central WSB, the flat land extends narrowly between the mountain ranges extending to the west and the coastline along the Gulf. Water resources in the Central WSB are limited with relatively small streams running in this part of the region. Annual precipitation averages 1,100 mm in Prachuap Khirikhan. In the Lower WSB, the annual precipitation is relatively higher (1,660 mm in Chumphon) and is less concentrated in the wet season (60 per cent of annual rainfall).

Soils in the WSB Region are mainly composed of Alfisols, Entisols, Inceptisols, and Ultisols. Alfisols, which are found in a relatively small area in the Mae Klong river basin, have low to moderate organic matter content. Entisols, with fine texture and poor drainability but fair fertility, are found in the coastal areas. Inceptisols are found in the lower Mae Klong river basin and coastal flat areas and are mainly utilized for rice cultivation at present. Ultisols are most dominant in the WSB; they are low in organic matter and sometimes acidic, and consequently their natural fertility is generally low. As a whole, since soils in the WSB Region are not particularly fertile, except for some areas in the lower Mae Klong river basin, careful management is required concerning the input of organic matter, water use, drainage, and erosion control in agricultural development.

(2) Social Situation

The WSB Region had a total population of 2.9 million in 1994, which accounted for 5.2 per cent of the national population. The Human Resources Planning Division of NESDB projected that the population of the WSB Region would reach 3.07 million in 2001, 3.18 million in 2006, and 3.31 million in 2011.

Table 2.01 Population

Province	(Thousands)			
	1994	2000	2007	2011
Kanchanaburi	668	702	734	753
Ratchaburi	767	806	843	866
S. Songkhram	199	209	219	238
Petchaburi	419	441	461	473
P. Khirikhan	428	450	470	483
Chumphon	415	447	479	498
WSB Total	2,896	3,054	3,206	3,312
Kingdom	58,709	62,405	65,938	67,712

The population growth rate of the WSB region varies by province, ranging from 0.56 per cent in Ratchaburi to 1.30 per cent in Chumphon. Emigration from the region to the

BMA is obvious, particularly in the Upper WSB provinces. Family planning coverage ranges from 66 per cent in Chumphon province to 85 per cent in Samut Songkhram. Population density is lowest in Kanchanaburi (37 persons per km² in the whole province) and highest in Samut Songkhram (494 persons per km²). The infant mortality rate (IMR) of Ratchaburi, Petchaburi, and Chumphon provinces is higher than the national average, 8.4 per 1,000 compared to 7.4 per 1,000.

Table 2.02 WSB Social Indicators

(1995)			
Province	Population Density (prs/km ²)	Population Growth Rate (%)	Family Planning Coverage (%)
Kanchanaburi	37	0.71	73.4
Ratchaburi	151	0.82	70.2
S. Songkhram	494	0.58	85.2
Petchaburi	71	0.55	n.a.
P. Khirikhan	71	0.91	77.0
Chumphon	70	1.30	66.0
WSB Kingdom	72	1.10	n.a.
	116		74.0

(1995)			
Province	Infant Mortality Rate (/1,000)	Nos. of Hospital Beds	Doctor per Population
Kanchanaburi	4.7	1,253	1:9,615
Ratchaburi	7.8	1,852	1:3,804
S. Songkhram	7.1	490	1:6,323
Petchaburi	9.8	654	1:9,209
P. Khirikhan	5.5	659	1:7,050
Chumphon	15.8	754	1:8,655
WSB Kingdom	8.4	5,672	1:7,441
	7.4		1:4,295

The urban population (population in municipalities and sanitary districts) in the WSB region was 30.7 per cent in 1995. The ratio of urban population to total population varies by province, from 22.5 per cent in Chumphon to 37.3 per cent in Petchaburi. Of the 451 Tambons in the WSB, only seven had a population over 25,000, while 16 had populations in the 15,000-25,000 range.

Table 2.03 Urban Population

(%)		
Province	Urban	Rural
Kanchanaburi	27.5	72.5
Ratchaburi	32.4	67.6
S. Songkhram	24.1	75.9
Petchaburi	37.3	62.7
P. Khirikhan	37.1	62.9
Chumphon	22.5	77.5
WSB Kingdom	30.7	69.3

The proportion of working-age population (13 years and older) to total population was 76.4 per cent. On the other hand, the labor force participation rate was 73.6 per cent (80.4 per cent for males and 67.1 per cent for females) in 1994. The labor force was estimated to

Table 2.04 Labor Force

(Thousands, %)			
Province	Pop. of Work Age	Labor Force Partic. (%)	Labor Force
Kanchanaburi	504	75.6	381
Ratchaburi	619	71.6	442
S. Songkhram	149	67.5	99
Petchaburi	333	74.7	249
P. Khirikhan	327	75.6	247
Chumphon	284	74.3	211
WSB Kingdom	2,212	73.6	1,628
	43,939	70.6	30,998

be 1.63 million. With an unemployment rate reported at 1.2 per cent, total employment in the WSB region was 1.61 million.

Employment in the agricultural sector accounted for about 51 per cent of total employment, or slightly higher than the rate of employment in this sector in the whole Kingdom. Agricultural employment is highest in Kanchanaburi (64.7 per cent) and lowest in Samut Songkhram (30.1 per cent). Employment in the industrial sector

(including mining, manufacturing, construction, electricity, gas, and water supply) is slightly higher in the WSB than the national average. Samut Songkhram province has the highest ratio of industrial sector employment, while Chumphon province is least industrialized. The service sector in Ratchaburi, Samut Songkhram, and Petchaburi accounted for more than 30 per cent of the total employment in each province.

Table 2.05 Employment by Industry
(% in 1994)

Province	Agriculture	Industry	Services
Kanchanaburi	64.7	16.8	18.5
Ratchaburi	42.5	26.6	30.9
S. Songkhram	30.1	37.9	32.0
Petchaburi	43.3	25.0	31.7
P. Khirikhan	54.4	18.6	27.0
Chumphon	58.5	16.1	25.4
WSB	50.9	22.2	26.9
Kingdom	50.3	21.3	28.4

(3) Economic Situation

GDP at constant 1988 prices amounted to 106 billion Baht in the WSB region in 1994. The annual growth rate averaged 6.3 per cent in 1981-1994 (5.8 per cent in 1981-1988 and 6.9 per cent in 1988-1994). The growth rate of Ratchaburi province has been remarkable in recent years (11.4 per cent in 1988-1994), while the growth of Kanchanaburi province has been rather stagnant. High growth rates in Ratchaburi, Prachuap Khirikhan, and Chumphon provinces are mainly attributable to an increase in the industrial sector, particularly manufacturing.

Table 2.06 Gross Provincial Product
(Million Baht in 1988 prices)

Province	1981	1988	1994	Annual Growth (%)	
				1981/88	1988/94
Kanchanaburi	14,401	21,574	24,201	5.9	1.9
Ratchaburi	11,673	16,426	31,370	5.0	11.4
S. Songkhram	2,463	3,282	5,042	4.2	7.4
Petchaburi	7,042	9,183	14,181	3.9	7.5
P. Khirikhan	7,206	11,880	18,086	7.4	7.3
Chumphon	5,153	8,556	13,145	7.5	7.4
WSB	47,938	70,901	106,026	5.8	6.9

The contribution of the agricultural sector to GRP has been decreasing (from 32.3 per cent in 1981 to 20.1 per cent in 1994), while the share of the industrial sector has been increasing steadily (from 21.1 per cent in 1981 to 37.3 per cent in 1994). The most notable is Ratchaburi province where the share of the agricultural sector decreased from 25.0 per cent in 1981 to 12.9 per cent in 1994, while the industrial sector increased from 29.9 per cent to 52.7 per cent in the same period.

Table 2.07 Shares of Gross Provincial Product
(% in 1994)

Province	Agriculture	Industry	Services
Kanchanaburi	19.7	30.9	49.4
Ratchaburi	12.9	52.7	34.4
S. Songkhram	16.5	24.0	59.5
Petchaburi	13.9	32.0	54.1
P. Khirikhan	21.2	42.9	35.9
Chumphon	44.2	15.8	40.0
WSB	19.3	39.5	41.2

GDP per worker in the WSB region averaged about 87,500 Baht in 1994. It is low in the agricultural sector (33,200 Baht or about 38 per cent of the regional average), while it has increased in the industrial and service sectors. The difference in GDP per worker by sector has been widening in recent years.

Table 2.08 WSB GDP per Worker (1994)

Indicator	Agricul.	Industry	Services	Total
GDP per worker (Baht)	33,190	137,510	149,100	87,479
Level (Total=100)	37.9	157.2	170.4	100.0

Value added in the manufacturing sector has increased remarkably in the WSB region. Total value added in the sector increased at an average annual rate of 19.2 per cent in 1990-1994. The increase in basic metal, rubber products, paper and printing, textile, and apparel has been especially high with the growth rate in these industries over 30 per cent in the 1990-1994 period. On the other hand, the share of value added in the food and beverage

Table 2.09 Manufacturing Value Added

Sector	Value Added *	Share (%)	Growth (%) (1990-1994)
Food, beverage, tobacco	12,457	43.8	10.4
Textile, apparel, leather	3,684	13.0	33.4
Wood and wood products	419	1.5	-3.5
Paper, printing, publishing	5,433	19.1	39.0
Chemicals, rubber, plastic	841	2.9	27.9
Non-metallic products	2,398	8.4	25.6
Basic metal	242	0.9	199.7
Fabricated metal, machinery	309	1.1	21.2
Other manufacturing	2,642	9.3	22.4
WSB	28,425	100.0	19.2

* in 1994 (Billion Baht in 1988 prices)

subsector in the WSB decreased from 59 per cent in 1990 to 44 per cent in 1994, though this subsector is still growing in the region.

2.3 Position of WSB Region

The physical, social and economic position of the WSB region is reviewed below in relation to other regions and the Kingdom as a whole.

(1) Physical/Land Characteristics

As noted, the WSB region has a 559 km long coastline. However, water in the inner Gulf is shallow, and it is not feasible to construct a deep-sea port along the coast of the WSB, except at Bang Saphan where a water depth of -20 m is available at around 900 m offshore. Indeed, Bang Saphan (Prachuap) port is the only available deep-sea port site along the Thai coast.

A large portion of the land area in the WSB region, about 39 per cent, is covered by forests, most of which are reserved/conserved forests. This proportion of forest coverage is the second highest among the seven regions of Thailand, after the Northern

region. Further, it is noted that the proportion of farmland in the WSB is limited to 27 per cent of the regional total, which is the lowest among Thailand's seven regions. Since the cultivable areas in the WSB have already been exploited rather extensively, further expansion of farmland in the region is less likely. Agricultural development planning in the WSB region will need to duly consider this finding.

Table 2.10 Land Utilization (% in 1991)

Region	Forest land	Farm land	Unclassified
WSB	38.7	26.6	34.7
BMA	-	54.3	45.7
Central	1.8	68.2	30.0
Eastern	21.1	48.0	30.9
Northeastern	12.9	54.7	32.4
Northern	45.5	27.7	26.8
Southern	19.0	39.2	41.8
Kingdom	26.6	41.5	31.9

(2) Social Characteristics

The population of the WSB region (2.9 million in 1994), which accounted for about 5.2 per cent of the national population, resides on a land area that represents about 8.5 per cent of the national territory. The region's population density is approximately 70 persons per km², making the WSB the most sparsely populated region of the country (more or less the same population density as in the Northern region). On the other hand, the proportion of population living in municipal areas (11.8 per cent) is higher than the average urbanization ratio in the five other regions (8.2 per cent) outside the BMA.

Table 2.11 Land and Population

Region	Land Area (1,000 Km ²)	Pop. Density (prs/Km ²)	Rate of Municipal Population (%)
WSB	43.2	70	11.8
BMA	7.8	1,141	71.1
Central	21.9	172	10.6
Eastern	36.5	106	13.4
Northeastern	168.9	122	5.5
Northern	169.6	70	7.3
Southern	64.7	108	12.6
Kingdom	513.1	115	17.6

The social indicators of the WSB region reveal some distinctive regional characteristics. For instance, the crude birth rate of the region (13.0 per 1,000 population) is lower than the national average, while the crude death rate (5.4 per 1,000 population) is higher than the average for the whole Kingdom. The infant mortality rate of the region (8.4

Table 2.12 Social Indicators

Indicators	WSB	Whole Kingdom	
	1995	1988	1995
Life expectancy - Male	n.a	63	66.6
Female	n.a	68	71.7
Infant mortality rate (/1,000)	8.4		7.4
Crude birth rate (/1,000)	13.0	17.0	16.5
Crude death rate (/1,000)	5.4		4.9
Maternal mortality (/1,000)	n.a	0.4	0.14
Population over 60 (%)	9.5	6.1	6.8

per 1,000) is still higher than the national average (7.4 per 1,000); also the ratio of population over 60 years of age (9.5 per cent in the WSB) is much higher than the national average (6.8 per cent). This implies that those of working age in the WSB are emigrating to urban areas in other regions (e.g., the BMA) to a certain extent.

Public health resources are unevenly distributed in Thailand. Of the total number of physicians in the country (12,800 in 1991), more than half (50.4 per cent) resided in the BMA, with only 4 per cent in the WSB. The doctor per population ratio is around 1:7,440 in the WSB, while the national average is about 1:4,300. The WSB has the second lowest number of physicians per population in Thailand, only ahead of the Northeastern region. The medical facilities in the WSB have improved to a considerable extent in recent years, but the number of hospital beds in the WSB is the lowest (6.9 per cent of the national total) among the seven regions of the Kingdom.

Table 2.13 Distribution of Health Resources

Region	Distrib. of Physicians (%)	Distrib. of Hospital Beds (%)	Doctors per Population
WSB	4.0	6.9	1:7,441
BMA	50.4	27.8	1:915
Central	3.3	6.2	1:5,548
Eastern	5.3	7.9	
Northeastern	14.2	19.8	1:10,740
Northern	13.6	18.7	1:6,318
Southern	9.2	12.7	1:5,968
Kingdom	100.0	100.0	1:4,295

The development of social and economic infrastructure in the WSB has also lagged behind the national average. For instance, the density of DOH roads in the region is 0.06 km/km², while the national average is 0.10 km/km² and 0.86 km per 1,000 population. The rate of household electrification in the WSB is 92.1 per cent, while it is 92.8 per cent in the entire Kingdom. Per capita electricity consumption was 840 kWh in the WSB in 1994, compared to 1,058 kWh in the entire Kingdom. Access to improved water supply is around 36 per cent in the WSB, while per capita water consumption is 57 m³ per annum (or 155 liters per day).

Table 2.14 Social Infrastructure

Indicator	WSB	Kingdom
Density of DOH Roads (Km/Km ²)	0.06	0.10
(Km/1,000 pop.)	0.86	0.86
Household electrification ratio (%)	92.1	92.8
Per capita electric. consumption (kWh)	840	1,058
Access to water supply (%)	36.0	-
Per capita water consumption (m ³ /y)	57.0	-

(3) Economic Characteristics

The GDP of the WSB region (140,773 billion Baht in 1994) accounted for 3.9 per cent of the Kingdom's GDP (3,600,906 billion Baht). The contribution of the WSB region to the national GDP was the smallest of any region amounting to only 1/13 of the GDP of the BMA, which

Table 2.15 Gross Regional Product (1994)

Region	GRP (Billion Baht)	Regional Share (%)	Real GRP Growth Rate 1981-1994
WSB	140,773	3.9	6.3
BMA	1,855,894	51.5	9.1
Central	174,524	4.9	8.3
Eastern	372,192	10.3	10.4
Northeastern	405,960	11.3	6.4
Northern	343,478	9.5	6.0
Southern	308,085	8.6	7.0
Kingdom	3,600,906	100.0	8.2

accounted for 51.5 per cent of the national GDP. The real GDP growth rate of the WSB region in 1981-1994 (6.3 per cent) was the second lowest among the seven regions, next

to the Northern region, and it was far below the national average growth rate (8.2 per cent). Moreover, the WSB's proportional contribution to the national economy has been gradually decreasing.

The per capita GDP of the WSB region in 1994 was 48,610 Baht, while the national average was 61,335 Baht. The region's per capita GDP was 79.3 per cent of the national average, or 26.1 per cent of the BMA's per capita GDP. Since the real GDP growth rate of the WSB is lower than the national average, the per capita GDP of the WSB will further decrease unless efforts are made to enhance the GDP output of the region. However, a positive economic indicator for the WSB is that the output per worker in the region rose to just over 60 per cent of the national figure by 1994, while it was only about 45 per cent in 1980 and 1990. This increase in output per worker reflects recent large-scale investment in some industries in the region.

Table 2.16 Per Capita GDP by (1994)

Region	Per Capita GDP (Baht)	As % of Kingdom	As % of BMA
WSB	48,610	79.3	26.1
BMA	186,167	303.5	100.0
Central	57,022	93.0	30.6
Eastern	100,321	163.6	53.9
Northeastern	20,235	33.0	10.9
Northern	31,064	50.6	16.7
Southern	39,789	64.9	21.4
Kingdom	61,335	100.0	32.9

The contribution of the agricultural sector to GDP was 19.3 per cent in the WSB, while the national average was 10.2 per cent. The contribution of the manufacturing sector in the WSB has increased in recent years, reaching 23.3 per cent in 1994, though it is still lower than the national average (28.2 per cent). The service sector is more or less at the same level as the national average. The share of the agricultural sector is high in the Southern region (36.0 per cent) while the share of the manufacturing sector is high in the Central region (39.5 per cent), the Eastern Region (38.1 per cent), and BMA (35.9 per cent).

Table 2.17 Shares of Gross Domestic Product (% 1994)

Sector	WSB	Kingdom
Agriculture	19.3	10.2
Crops	10.8	5.6
Livestock	1.8	1.0
Fisheries	3.9	1.7
Forestry	0.5	0.1
Others	2.3	1.8
Mining and quarrying	1.6	1.3
Manufacturing	23.3	28.2
Construction	7.6	7.4
Electricity and water	2.4	2.3
Transportation/comm	4.6	7.4
Services	41.2	43.2
GRP	100.0	100.0

Also worth noting, the construction of a large steel complex was initiated in the WSB in 1994, with the value added of the complex (consisting of a hot rolled mill producing 2.4 million tons a year, a cold rolled mill producing 1.0 million tons, a bar mill producing 720,000 tons, and a galvanized coated mill producing 135,000 tons) to reach

approximately 7 billion Baht in 1997. The value added of the complex will correspond to about 6 to 7 per cent of the GDP of the WSB region by 2001.

2.4 Problem Structure

Through a review of the existing physical, social, and economic conditions in the WSB region, and an analysis of the region's comparative position in the Kingdom and/or relative to other regions, various problems related to social and economic development of the region have been clarified. Many of these problems are interrelated; some problems are outcomes of other more fundamental problems. These interrelated problems have been analyzed to understand the overall problem structure of the WSB.

(1) Fundamental Factors

Problems in the WSB relate to a number of fundamental natural/physical and social/institutional factors. The main factors are the following:

Natural/physical factors

Limited land resources: The WSB region covers 8.5 per cent of the national land area, but cultivable farmland is limited to 27 per cent of the regional total. The region's morphology is characterized by its narrow and elongated shape, and farmland in the region is largely confined to the narrow strips between the coast and the mountains.

Unfavorable soil conditions: Soil in the WSB region is generally not fertile, with Ultisols being the most dominant soil type. More fertile soil is limited to the land along lower reaches of the Mae Klong river.

Uneven and limited water availability: Annual rainfall in the WSB region ranges between 1,000 mm and 1,700 mm, and seasonal variation is large. For instance, Petchaburi has an annual rainfall of about 1,000 mm, but more than 80 per cent falls in the wet season from May through October. Rainfall is generally higher in the Lower WSB, but its availability is limited by the narrowness of the region in this area.

Distance from Bangkok: The Upper WSB is adjacent to the BMA and affected in both positive and negative ways by the capital city. The dominant effects of the BMA do not extend all the way to the Lower WSB due to the region's elongated shape; the long distance from the BMA in this part of the region is by itself a constraint.

Social/institutional factors

Insufficient decentralization policy: Decentralization has long been discussed within the context of national development policy. So far, however, only deconcentration of limited administrative functions has been effected.

Inadequate regional development planning and administration: Thailand has an established regional or rural development planning system within the central administration. NESDB and its regional centers are instrumental in this system for the planning and coordination of development activities. The WSB region has not been covered by coherent development planning or an administration, and therefore it lacks an effective development strategy.

Inadequate incentives for investment: The WSB region is defined as Zone 2 and Zone 3 under the BOI incentive zoning scheme. The region, however, has attracted fewer investors than the ESB and Upper Central region.

Increasing cross-border immigrants: Due to its geographic position, a relatively large number of immigrants, legal and illegal, enter the WSB region. They provide an inexpensive labor force.

(2) Problem Interactions

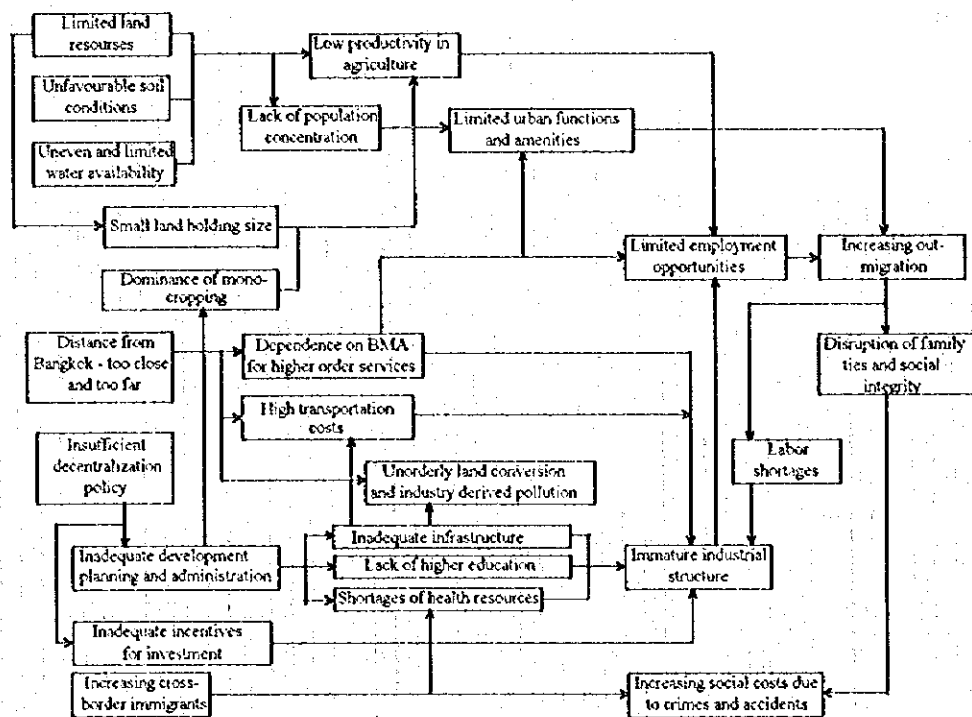
The natural factors mentioned above are largely accountable for the region's low productivity in agriculture. Small land holdings and the dominance of mono-culture also contribute to this problem. The same natural factors explain the lack of population concentration in the WSB region and resultant limited urban functions and amenities.

The WSB's proximity to Bangkok causes, on the one hand, the region's dependence on the BMA for higher-order services, and its poor land conservation practices and associated environmental problems. The region's relative remoteness from Bangkok, on the other hand, is a factor that leads to high transportation costs, especially in the Lower WSB.

Inadequate regional development planning and administration is at the root of the region's inadequate infrastructure, its lack of facilities for higher education and, its shortage of health resources. These problems together with dependence on the BMA and high transportation costs contribute to the region's immature industrial structure.

The limited employment opportunities in the WSB region is an outcome of these interrelated problems and a cause for increasing out-migration. The out-migration causes various social problems including disruption of family ties and social integrity. It is naturally a factor causing existing labor shortages.

The increased number of cross-border migrants is causing, among other impacts, increased pressure on existing social services and facilities. Together with the out-migration, social costs are increasing in the WSB region due to increasing crime, accidents, and incidence of some diseases.



Problem Structure of the WSB Region

(3) Critical Problems

Most critical problems facing the WSB region have economic, social, and environmental dimensions. These problems follow from the limited employment opportunities, tightening social conditions with respect to the value system and quality of life, and degrading of environmental quality. WSB regional development planning should address these critical problems in line with existing development policies and the priorities of the national government.

2.5 Regional Development Objectives and Basic Strategy

On the basis of the review of the characteristics and position of the WSB region, as well as a review of national development plans and visions, objectives and basic strategies for the development of the WSB region are defined herein.

(1) Development Policies

As introduced in Section 2.1, NESDB has recently issued medium- and long-term development plans and visions. While the policies adopted in each plan and vision were summarized in Section 2.1, some targets are additionally noted here.

Table 2.18 Key Economic Indicators by 5-year Plan

The 8th Plan has the target of maintaining stable economic growth, with the GDP growth rate during the plan period set at 8.0 per cent, and the inflation rate set to be less than 4.5 per cent. Per capita GDP is to reach a national average of 109,800 Baht in 2001, as shown in Table 2.18.

Indicator	6th Plan	7th Plan		8th Plan
	1987-1991	1992-1996		1997-2001
	Actual	Target	Est. Actual	Target
1. GDP growth (%)	10.8	8.2	8.1	8.0
Agric	3.4	3.4	3.2	3.0
Manufact	13.9	9.5	10.1	10.1
Constru	18.1	8.9	8.7	11.3
Ser	11.0	8.1	8.0	7.2
2. Investment growth				
Pr	26.0	8.8	7.6	9.9
P	6.5	8.5	17.0	15.7
3. Trade growth (%)				
Ex	24.5	14.7	14.3	15.1
Im	31.9	11.4	13.8	12.6
4. Inflation (%)	4.7	5.6	4.8	4.5
5. Unemployment (%)	0.6	0.5	1.0	0.4
6. Per capita GDP (Baht)	41,100	71,000	76,884	109,800

The 8th Plan indicates some other targets, including:

- * Household savings are to be increased to more than 10 per cent of GDP by 2001.
- * Compulsory education is to be increased from 9 to 12 years.
- * The number of graduates from university faculties of science and engineering is to be increased at an annual rate of 15 per cent during the plan period.
- * Investment in research and development (R&D) is to treble as a percentage of GDP, from 0.25 to 0.75 per cent.
- * Infrastructure for agriculture will be promoted, including infrastructure for the improvement of regional agricultural markets.
- * More than 1,000 km of interprovincial highways will be developed during the plan period.

- * The production of commercial energy will be increased by more than 5 per cent per annum.
- * A 100 per cent household electrification rate will be attained in the plan period.
- * The number of telephone lines will be increased to attain a level of 20 lines per 100 population, to promote decentralization.
- * The rural water supply system will be expanded to 18,000 villages during the plan period.

While "Thailand Vision 2020" did not clearly indicate any target social and economic indicators, it showed a direction and vision of development, as introduced in Section 2.1. Also, some indicative figures are implicit in "Thailand Vision 2020", including the following:

- * Real GDP growth in the 9th Plan (2002-2006) and 10th Plan (2007-2011) periods is to be around 7.5 per cent and 7.0 per cent, respectively.
- * National population is to reach 67.7 million at the end of the 10th Plan period (2011).
- * Per capita GDP in 1994 prices is to reach 185,400 Baht at the end of the 10th Plan period (2011).

To assure consistency with national policy, the development objectives for the WSB region will be defined in this study by referring to the medium- and long-term national development policies defined by the Government.

(2) WSB Development Objectives

The problem structure analysis set out in Section 2.4 has clarified major factors and interactions of constraints to be addressed through the planned development efforts. National level policies for social and economic development were presented in Sections 2.1 and 2.5 (1). Development objectives for the WSB region have been established to address the various constraints facing the region, in line with current development policies, objectives, and targets.

Therefore, the objectives of the WSB regional development are proposed as follows:

- (i) To enhance the quality of life of the people in the WSB region, through enhancement of household incomes, and attainment of education and

other social sector development, as well as improvement of social infrastructure.

- (ii) To improve and maintain amenities in the region, so that people in the WSB can enjoy a healthy and pleasant life in their respective communities, and to enhance the quality of the environment by assuring environmentally sound and sustainable development.
- (iii) To further improve social and economic infrastructure to enhance regional production and productivity, as well as the quality of life and amenities in the region.

Consequently, the WSB regional development plan will be directed towards creation of a "production and amenity region" in this part of the Kingdom.

It is additionally noted that a general target of the WSB regional development plan will be to attain the level of the national average in various social and economic indicators. The specific targets of the WSB regional development plan will be discussed in Chapter 3.

(3) WSB Development Strategy

To attain the objectives of the WSB regional development plan in an effective and efficient manner, focuses are put on some fundamental factors that are to be strategically addressed in formulating the regional development plan. These factors will include:

- (i) Socially-oriented regional development: The 8th Plan puts considerably more emphasis on the social and human aspects of the development than previous plans, and this policy will almost certainly be maintained in subsequent plan periods. Therefore, this policy of socially-oriented development should be followed in the formulation of the WSB regional development plan.
- (ii) Globalization policy: The WSB regional development plan cannot be formulated only within the regional framework, particularly when free trade is to be promoted with Thailand as a member country of the World Trade Organization (WTO) and as one of the promoters of the ASEAN Free Trade Area (AFTA). Therefore, free trade and globalization should

be addressed in formulating regional development strategies and specific development projects for the WSB.

- (iii) Subregional and interregional cooperation: With relatively limited resources available within the region, the WSB alone can hardly attain its development objectives. Therefore, subregional cooperation with Myanmar and cooperation with other regions of Thailand will be of great significance for the strategic regional development of the WSB.
- (iv) Promotion of decentralization: Regional development in the WSB should result, in one way or another, in the actual promotion of decentralization from BMA. Decentralization should be strategically addressed in formulating development plans for the WSB.
- (v) Technological advancement: Considering that the weakest point of Thai economic development in the past has been the limited accumulation of technologies, the development plan for the WSB should be formulated to facilitate and promote the advancement and accumulation of technologies.

These development strategies will be key factors to achieve prosperity of the WSB region through linkages and partnership. These strategies will therefore be pursued in the formulation of frameworks for development of the WSB region, as well as in the formulation of development plans and programs to be proposed for the region's development.

Chapter 3 DEVELOPMENT SCENARIOS AND FRAMEWORKS

3.1 *Social and Human Development Scenarios*

Since the development objectives are socially-oriented and human-centered, the scenarios for regional development of the WSB are first discussed from the viewpoint of social and human development.

3.1.1 Vision for WSB Social Development

Development of the WSB region will continue to be an essential component of national socioeconomic development. Particularly in view of the major departure of the 8th Five-Year Plan from the efficiency- and economic growth-oriented development paradigm, the social development of the WSB should aim at the following:

- (1) Early realization of the post-industrialization or post-AFTA society anticipated by Thailand Vision 2020 based on socially-oriented and human-centered development.

Development of the WSB region will have to be based on the region's resource base and other existing conditions as analyzed in Chapter 2. In particular, given the region's limited natural resources and considering its strategic location close to the BMA, the WSB should specialize in certain social functions complementary to those of the BMA. Thus, the following is another important aspect of the social development of the WSB:

- (2) Establishment of a social niche as an integrated part of the Greater BMA Region, and as a functional capital of continental Southeast Asia, providing functions complementary to those of the BMA, specializing in certain social services and amenities such as research and development, advanced education, tourism-related services, and community-based health care.

3.1.2 Scenarios for Social Development of the WSB

(1) Basic Perception

Attainment of the vision for the social development of WSB would involve significant changes in the social structure and needs of the region. One fundamental change would be that from a region with net out-migration (as at present) to one with net in-migration. Even if productivity in the region were increased to minimize the need for an increased labor force and associated social changes, net in-migration to the region may occur in the near future. Indeed, the WSB region already receives a large number of in-migrants from Myanmar. How to accommodate these in-migrants, especially in relation to the impact on changing local communities and concerns related to local participation, is an additional issue to be addressed in WSB regional development master planning.

Formulation of scenarios for social development of the WSB should consider the increasing number of in-migrants as providing a wider range of opportunities for socio-cultural and human development. As the population of the WSB region becomes socially more diversified, more dynamic interactions would be expected between peoples of different backgrounds, and more diversified social services may be justified.

(2) Some Early Changes

At a fairly early stage in the development process, pressures will develop that will tend to alter migration patterns. For example, emerging labor shortages will result in rising wages, which will depress tendencies for out-migration.

As economic development picks up, urbanization is likely to increase. This pattern is generally associated with a weakening of ties among family members and neighbors. Also with urbanization comes environmental degradation.

Labor market pressures may mount to increase female participation in the work place, creating deficits in time available for non-market activities (i.e., housework), which may induce social developments in response. Implicit day-care costs will increase as the extended family support system is eroded. Income distribution may continue to worsen, even while poverty incidence continues to fall and the middle class increases in relative terms.

Political participation might decline as individuals begin to feel a growing detachment from their neighborhoods and communities. To cope with the requirement of a changing social

structure, a more flexible system of development planning and administration will be necessary. Such a system would be based on more substantive participation by local people/communities in various functions from participatory planning to monitoring and evaluation.

Initiation of the structural changes envisioned above may be facilitated by early implementation of some key development activities including the following:

- (i) pilot implementation of a participatory health care system;
- (ii) establishment of new institutes for advanced research and education;
- (iii) upgrading of facilities for conventional tourism capitalizing on existing tourism activities and facilities; and
- (iv) establishment of a monitoring system for social changes with local participation.

(3) Broad-Based Changes

As the WSB region moves toward becoming a region with net in-migration, more broad-based improvements of social services and amenities will be undertaken. The increasing number of in-migrants will justify more accelerated improvement of various social services and facilities serving local people. Such improvements should be made with a view toward inducing more dynamic interactions between the "original" inhabitants and the new in-migrants. To bring about more effective interactions, a holistic approach should be adopted, addressing the various concerns for social and human development in their totality rather than in a piecemeal manner.

Adoption of a holistic approach to social and human development will ensure that opportunities are available for all related activities involved in realizing social and human development. These opportunities go beyond social services and extend to related areas. Expected changes linked with the different opportunities are described below:

- (i) Opportunities in Health Services, such as better access to physicians, hospitals and clinics, and an assurance that payment would be provided for these services, from either public or private funds. The problem of health care provision should be minimized when health standards are increased. The WSB plan therefore recommends programs to stimulate better nutrition, pre-natal care, upgraded occupational health and safety standards, improved information dissemination about health issues, and the like. One of the most important sub-issues within the health sector in the WSB is how to increase the number of health

providers (e.g., physicians, nurses, dentists). To attain the level of the national average in public health indicators, the WSB will have to double the number of physicians currently available.

(ii) Opportunities in Education and Training. Improvement of the quality of education and training will require expansion of facilities particularly in rural areas, and an upgrading of teachers and teaching methods in all areas. Since much of the necessary job training of the area labor force should be provided on the job, the private sector should have a leading role in the provision of training. However, the Government can assist workplace training through the provision of competency standards and certified skills testing. The upgrading of educational standards should be a prime concern to be addressed in the WSB regional development plan.

(iii) Opportunities in Housing, i.e., provision of available units at reasonable prices, depending on population patterns. The current housing situation in the WSB is generally adequate. A critical question, however, is whether development of the WSB will induce an influx of either Thais or foreigners, who might strain the social environment; this is particularly important if and when industrialization is accelerated in the WSB region. Zoning can be an effective tool to permit residents to retain the character of their living areas.

(iv) Opportunities in Transportation. While attention is paid to the placement of highways and motorways to facilitate trade, local roads should also be improved to promote social/human development. Intraregional local road networks should be expanded to promote rural development, and also allow local commuters to avoid the major highways.

(v) Opportunities in Amenities. Matching improvements in local roads should be improvements in amenities such as retail stores, libraries, theaters and arenas, sports facilities, recreational areas, and the like. The distribution of amenities in rural areas, or their nearby urban environs, is particularly important. Cultural activities should also be promoted. Opportunities for promoting amenities should be addressed in both rural and urban areas of the WSB.

(vi) Availability of Social Infrastructure, such as sanitation, water, sewerage, drainage, electricity, and garbage disposal, both in rural and urban areas in the WSB. The service ratios of these types of social infrastructure in the WSB are

still below the national average, as shown in Section 2.3 (2). The WSB regional development plan should aim at attaining a level of social infrastructure at least at the national average.

(vii) Opportunities for Productive Use of Non-Work Time. Sports/recreational facilities are important in overall regional development. Equally important are libraries and other learning centers, including community colleges and non-formal educational facilities. The availability of learning opportunities (public and private) is an important component of individual and social well-being.

(viii) Job and Wage Opportunities. The types of jobs to be made available in the WSB will largely determine the socioeconomic backgrounds of the region's residents. Moreover, jobs determine incomes and thus help determine the macroeconomic environment of a region. Through interviews in the Study Area, it was found that WSB residents are keen to see an improvement in job and wage opportunities. At the same time, residents are concerned about environmental issues and are worried about pollution and other possible external diseconomies from industrialization. Enhancement of job and wage opportunities should go hand in hand with environmental considerations.

(ix) Access to the Decision-Making Process. Empowerment of the people requires that local views on development be articulated and fed into the decision process. The local administrative structure, constrained as it is by the current national centralization of authority, does not appear conducive to the desired dialogue between administrators and local residents. As manifested in the 8th Plan, however, access to the decision-making process should be promoted to enhance social/human development.

(x) Socially-Friendly Environment. Amicable, helpful, reliable interactions among neighbors will have to be promoted to establish a socially-friendly environment in the region. This sort of objective is not easily legislated, but there are a few measures the Government can take to encourage interaction among local residents, such as the creation of civic or neighborhood associations. In addition, NGOs can act to open lines of communication between residents and local officials. Also, local cultural events stimulate desired interactions among local residents.

(4) Social Changes and Monitoring

The holistic approach, if carefully pursued, would lead to the attainment of higher levels of social and human development at the least cost, as it supports interactions of related elements to realize more than the sum of all the elements. For the holistic approach to be effective, however, it would have to be implemented together with a monitoring system. In other words, the recommended holistic approach involves selective and cautious implementation of various measures, while monitoring their effects and constantly making adjustments to improve efficiency. Likely changes and factors causing them need to be anticipated to design the monitoring system and to use the monitored results for the formulation of more effective measures. Macro changes are anticipated in the following social indicators during the plan period:

- (i) Population—migration pattern, birth and death rates, geographic distribution (urban/rural);
- (ii) Employment and wages by sector/occupation, by gender and by age group;
- (iii) Income—overall income level, disparities between geographic areas (urban/rural), occupation groups, and education/training opportunities; and
- (iv) Quality of life and lifestyles.

Micro changes in the following social indices can be measured, which would explain good part of the macro changes:

- (i) Number of various service providers by qualification—education (formal, non-formal and recurrent), health, skill training,
- (ii) Morbidity and mortality by cause (disease, accidents),
- (iii) Education performance—enrollment, drop-out, literacy, test scores by major subject, and
- (iv) Number of accidents, pollution cases, and other social problems.

Changes in household income by source and expenditure by use would help to understand the changing quality of life and lifestyles. In addition, a well-structured perception survey may help to reveal changes in the quality of life and lifestyles as well as social values (traditional value, family ties, environmental quality).

A prerequisite to implementing the holistic approach with a monitoring system is further decentralization of development administration. This, in turn, is subject to strengthening of

the financial base at the local level. One way to expand local financial resources would be to encourage direct contributions by local residents and businesses to finance local projects through social partnership. For example, collections could be taken up by local foundations or wats to finance new equipment, facilities, or textbooks for local schools, or to cover hospital fees for the socially deprived. Participatory development tied to financing is another innovation that should be pursued within the WSB region.

3.2 Macroeconomic Development Scenarios

Based on current circumstances in the WSB region, present national development policies, and the development prospects of the region, three distinct alternatives are formulated for the growth of GDP and employment in the WSB region until the end of the 10th National Economic and Social Development Plan in 2011.

(1) Definition of Alternatives

The three alternative development scenarios have been defined as follows:

Trend Development

The Trend Development Scenario represents the continuation of what has been taking place in the WSB region. The growth rate in this scenario is relatively low, and the level of industrialization is also low. Under this scenario, per capita GDP in the WSB would continue to fall relative to the Kingdom average.

Moderate Development

The Moderate Development Scenario represents some policy-based development to attain a moderate level of economic growth in the region. This alternative incorporates and substantially implements most of the development ideas to be discussed in each sector, and sets the region on a higher economic growth path than that of the Kingdom as a whole so as to reduce the present regional income disparity.

Accelerated Development

The Accelerated Development Scenario would attain the highest level of economic growth through further industrialization. This high level of industrialization, particularly in the 9th and 10th Plan period, will be supported by "foot-tight" industries, including development of downstream natural gas

industries and/or a greater inducement of high-level manufacturing industries than deemed readily feasible in the Moderate Development case.

(2) Alternative Macroeconomic Frameworks

For the three development alternatives, as defined above, macroeconomic frameworks have been worked out as summarized below.

Trend Development

The trend annual growth rates for the agriculture, industry, and service sectors have been estimated by linear regression of logarithms of GDP for the 1981-1994 period. The estimated growth rates are 2.0 per cent for agriculture, 8.8 per cent for industry, and 5.6 per cent for the service sector. This framework indicates that the WSB economy would grow 6.2-6.7 per cent annually over the 8th, 9th, and 10th Plan periods, averaging 6.4 per cent during the 1995-2011 period. In this period, agriculture's share in total output would fall from 19 to 9 per cent of GDP, while the industry sector's share would increase from 35 to just over 50 per cent in 2011. Population growth in the WSB (0.8 per cent per annum) is expected to be the same as for the country at large during the period to 2011.

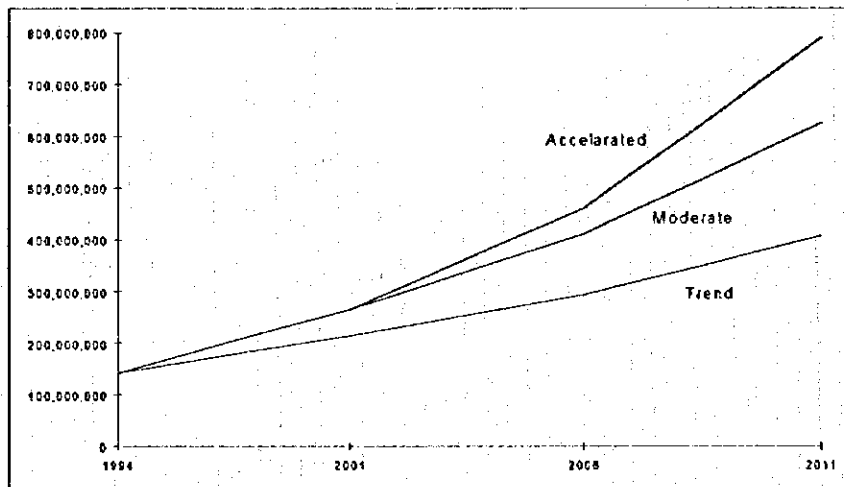
Moderate Development

In the Moderate Development Scenario all sectors are expected to grow at rates higher than their trend rates. Agricultural GDP is expected to grow at 2.0, 2.5, and 3.0 per cent annually during the 8th through 10th Plan period, though these growth rates would still be below the national sectoral trend of 3.5-4.0 per cent. The industrial sector would grow at 14.0, 10.0, and 8.5 per cent annually in the 8th, 9th, and 10th Plan periods, respectively, or 9.2 per cent in the 1995-2011 period. The fast growth in the 8th Plan period reflects large investment projects, including a steel complex development in Bang Saphan. Industrial growth is also expected to be augmented by the development of some industrial estates in the WSB. The share of industry in the WSB's total GDP is expected to increase from 35 per cent to 48 per cent over the 1994-2011 period, given the 11 per cent annual growth rate. Total employment would increase by 1.8 per cent annually or about 560,000 workers over the period. About 446,000 workers are expected to be added in the industry sector over the period to 2011, while employment in the agriculture sector would decline by about 361,000 workers. Under this framework, the WSB per capita GDP would increase steadily and move from 79 per cent to about 98 per cent of the level of Kingdom's per capita GDP by 2011.

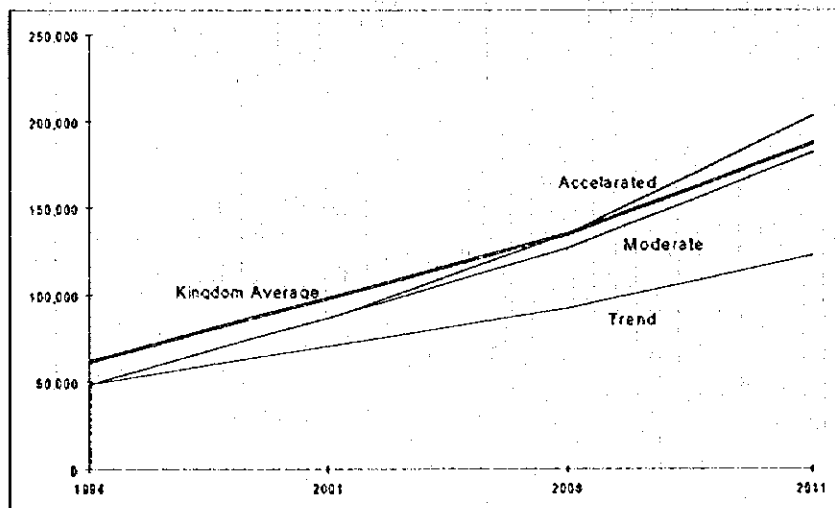
Accelerated Development

Under the Accelerated Development Scenario, industry is expected to grow at higher rates during the 9th and 10th Plan periods: at 15 per cent annually during the 9th Plan and 12 per cent during the 10th Plan. These rates are 3.5 to 5.0 percentage points over those assumed in the Moderate Development Scenario, and they would raise the overall GDP annual growth rate of the WSB to 10.7 per cent for the period to 2011. The Accelerated Development Scenario implies a doubling in population growth (to nearly 2.0 per cent annually) and a larger in-migration of workers to the region.

The GDP growth rates and per capita GDP under each alternative scenario is summarized below.



(Real) GDP Growth



(Real) Per Capita GDP Growth

(3) Evaluation of Alternatives

The development alternatives may be evaluated from several points of view. The WSB regional development objectives, as discussed in Section 2.5, naturally provide a set of evaluation criteria: i.e., (i) enhancement of quality of life through enhancement of household incomes; (ii) emphasis on social and human development; (iii) economic growth through enhancement of production and productivity; and (iv) environmentally sustainable development. It is additionally defined that the WSB regional development plan will set as a target that the region attain the national average level in various social and economic indicators. Evaluation by these criteria is summarized in the table below.

Table 3.01 Summary Evaluation of Development Scenarios

Trend Development	Moderate Development	Accelerated Development
GDP Growth Rate: Low	Medium	High
Total GDP: 6.4%	Total GDP: 9.2%	Total GDP: 10.7%
Agriculture: 2.0%	Agriculture: 2.4%	Agriculture: 2.4%
Industry: 8.8%	Industry: 11.2%	Industry: 13.7%
Services: 5.6%	Services: 9.2%	Services: 9.8%
Employment		
Pop. Growth: 0.8% p.a.	Pop. Growth: 1.0% p.a.	Pop. Growth: 2.0% p.a.
Agric. employ.: +27,000 wkrs.	Agric. employ.: +361,000 wkrs.	Agric. employ.: +631,000 wkrs.
Ind. employ.: +350,000 wkrs.	Ind. employ.: +466,000 wkrs.	Ind. employ.: +807,000 wkrs.
Social Impact		
Dispersed population distribution and seasonal unemployment	Moderate immigration and/or return of workers to WSB.	Large immigration and social distortions.
Per Capita GDP		
In 2011: 122,660	In 2011: 182,040	In 2011: 202,840
% of national average: 65.2%	% of national average: 98.2%	% of national average: 109.4%
Environmental Impact		
Less effect on environment	Manageable effects environment	Large impact on air and water quality

An opinion was presented that a target growth rate in the agriculture sector (2.4 per cent) was still on the high side. It is noted, however, that the agricultural growth would be achieved through a shift of land use from the cultivation of low-value traditional crop to the production of high-value products and through the improvement of productivity (as discussed in Section 6.1.2). The target growth rate in the agriculture sector would be attainable if appropriate measures are taken as proposed in this master plan.

Another opinion was that the growth rate of total GDP (9.2 per cent) appeared on the high side in view of economic recession in 1996. As far as the growth rates of national GDP envisaged in the 8th Plan (8.0 per cent) and in "Thailand Vision 2020" (7.5 per cent

in 2002-2006 and 7.0 per cent in 2007-2011) are to be referred to, the target growth rate of the WSB would not be too high to be attained. In the event, however, that the national macroeconomic framework is revised, the target growth rate of the WSB might be modified accordingly.

Judging from the results of the evaluation, it appears reasonable that the WSB regional development plan be formulated in line with the "Moderate Development Scenario". Under this scenario, as indicated in the Table above, per capita GDP in the WSB region will become more or less equal to the national average per capita GDP by 2011. Further justification of the selection of this scenario will be provided in the sectoral development plans.

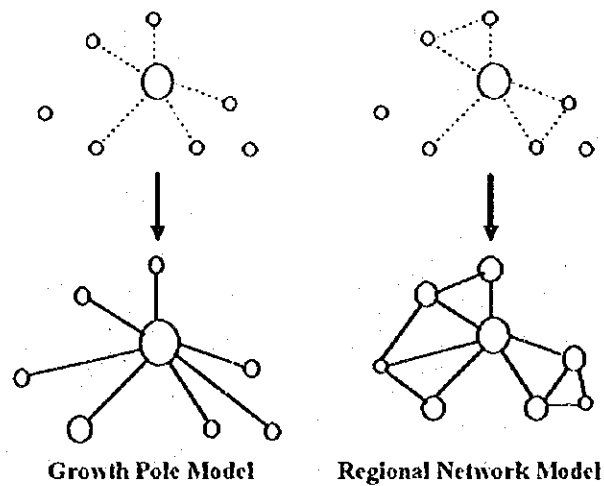
3.3 Regional Development Patterns

Before discussion of alternative spatial development plans, some alternative patterns of regional development planning are evaluated with respect to the strategic formulation of the WSB regional development plan.

(1) Growth Pole Model vs. Regional Network Model

Through the 6th Plan, the Royal Thai Government applied in principle a growth pole strategy for regional development. Under the 7th Plan, a new strategy, termed the "regional network approach" has been applied, and it is generally applied in the 8th Plan as well as in the formulation of the national spatial development framework (as introduced in Section 2.1 (3)).

A basic premise of the regional network approach is that cities and towns within a region or subregion are members of a cluster of urban centers or industrial zones. These centers interact with each other, as well as with their hinterlands (rural areas) to realize a totality that is more than the sum of its parts. The model of the regional network approach to urban development is schematically illustrated below.

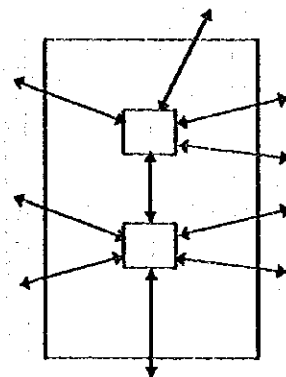


Applicability of these alternative models to the WSB may be summarized as follows:

- (i) The Upper WSB is rapidly urbanizing with a spillover effect of the BMA. Development of the BMA itself fits with the growth pole model. From the regional development point of view, however, the Upper WSB cities are expected to develop as urban clusters in line with the regional network model for more autonomous development.
- (ii) The Central and Lower WSB have a long stretch of narrow land with a few urban centers developed in a linear form. The urbanization drive due to the BMA spillover does not extend to these areas, and thus the application of the regional network model is difficult in this part of the Study Area.

(2) Multiple Access Model

The WSB is geographically narrow and elongated, and located in between the Central and Southern regions. The WSB region is accessible from various directions, by land, sea, and air, and by satellite. Consequently, an alternative approach, termed the "multiple access model" as schematically illustrated on the right, may be more appropriate for WSB regional development planning.



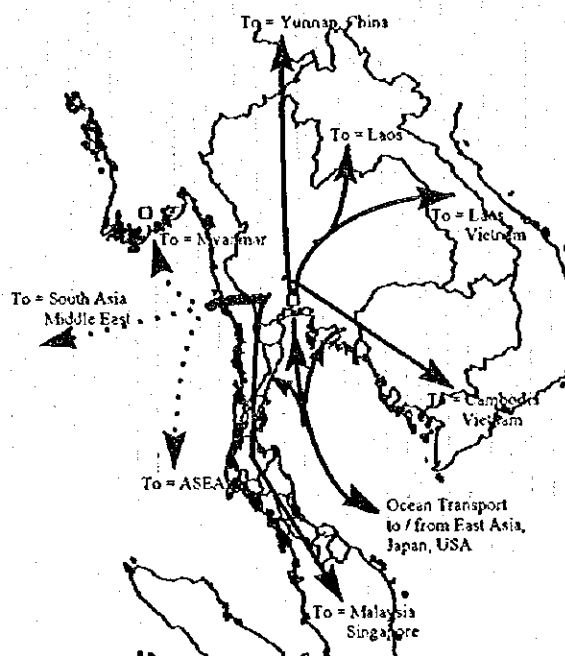
This multiple access model can be productively applied to the WSB for the following reasons:

Multiple Access Model

- (i) The WSB is not only linked by the north-south development artery along Route 4 but it is also accessible by land, sea, and air from other regions.
- (ii) The multiple access model will promote linkages of areas and regions, as well as linkages among economic sectors.
- (iii) Development of the WSB should be strategically promoted under globalization and subregional and regional cooperation policies, as noted in Section 2.5 (3). Under the globalization policy, a free trade regime is to be promoted, and the multiple access model is ideal for its promotion.
- (iv) Decentralization can also be promoted, as in the case of the regional network approach, because the multiple access model depends less on one center (BMA) and subregional and regional cooperation is to be accelerated.

(3) Multiple Access Approach Applied to the WSB

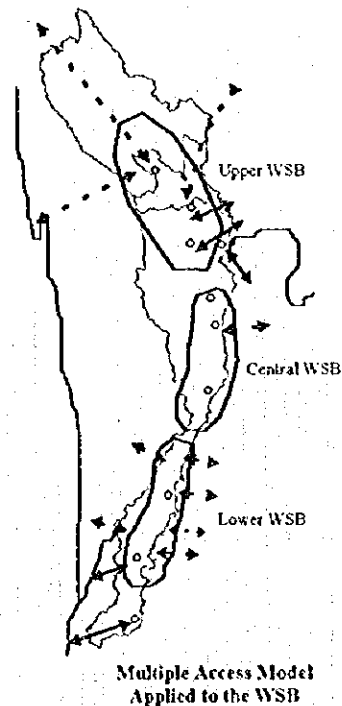
From the viewpoint of globalization and subregional cooperation, the WSB region will be positioned as illustrated below. Access points to the WSB are provided not only from the north and south but also by shipping lanes, air links, and subregional and regional cooperation.



Globalization and Subregional Cooperation from the Viewpoint of the Regional Transportation Network

More specifically, the WSB will be accessible by air (Chumphon airport at Pathiu), by sea (e.g., through Prachuap deep-sea port at Bang Saphan, Chumphon port, a port at Petchaburi or Samut Songkhram, a dedicated port for an Independent Power Producer in Prachuap Khirikhan), and by land (to/from the Central and Southern regions). In the longer term, the WSB will be linked to/from Tenasserim Division of Myanmar, where some east-west corridors could be developed. The multiple access approach applied to the WSB region is illustrated below, mainly from the viewpoint of transportation access.

The multiple access approach will have impacts on the development of the peripheries or rural areas. For instance, the promotion of trade and linkages through the multiple access approach will directly involve rural areas, a favorable effect in view of the Government's social/human development policies.



3.4 Spatial Development Framework

A spatial development framework has been formulated for the selected moderate economic development scenario, by applying the multiple access approach and considering the regional socioeconomic situation as well as the development constraints/potentials of the WSB region.

(1) Elements of Spatial Development Framework for the WSB

The spatial development of the WSB region, following largely the multiple access approach, will be supported by the following elements:

- (i) North-South and East-West Arteries: Two arteries, north-south and east-west, serving the WSB region should be developed as a part of an international road network; the north-south artery linking Yunnan province,

People's Republic of China to the north and Malaysia/Singapore and Indonesia to the south, and the east-west artery linking Indochina (Cambodia, Lao PDR, and Vietnam) and Myanmar (and South Asia). The WSB is located at a major crossroads between these two international arteries, and therefore globalization/subregional cooperation can be strategically promoted.

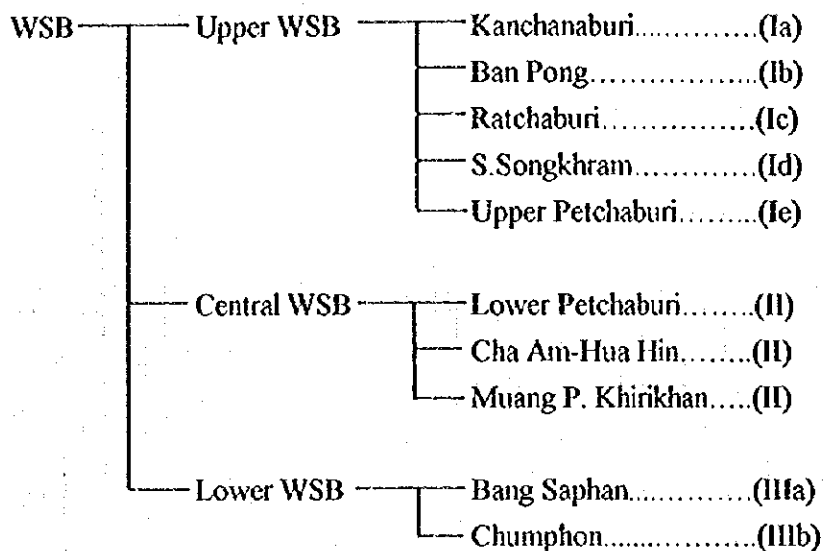
(ii) **Establishment of Sea Lanes:** Since the WSB has a long coastline (559 km) along the Gulf of Thailand, sea lanes should be established as an integral part of a multimodal transportation system. Though the Inner Gulf has shallow water depths along the coast, some feeder port facilities could be developed, with Bang Saphan as the region's deep-sea hub port. Interregional linkage with the ESB and SSB, as well as international linkage, should be promoted through establishment of sea lanes.

(iii) **Promotion of Communication Networks via Satellite:** High-speed digital communication networks via satellite will be developed in the near future, further accelerating globalization. Concentration in the BMA would be less attractive under such circumstances, and decentralization would be promoted. The WSB region should be prepared for such an era.

(iv) **Improved Access to Arteries, Sealanes, and Communication Networks:** The major arteries, sea lanes, and communication networks via satellite would form axes, and several regional centers would be developed. These axes and regional centers should integrate the rural areas, and access to these networks should be improved at the same time.

(2) Subdivision of the WSB

The WSB region is composed of geographic areas that are distinctly different from each other, agro-ecologically, morphologically, or otherwise. The region may be subdivided as follows:



The Upper WSB, which has a relatively extensive land area and abundant water resources, is divided into the upland area of Kanchanaburi, which has unique agro-ecological conditions, and the spillover area of the BMA, which is located within a radius of about 100 km from the BMA. The spillover area covers the Ban Pong area (the crossroads of the north-south and east-west arteries), Ratchaburi province, Samut Songkhram province, and the upper part of Petchaburi province (near Amphoe Khao Yoi). The Central WSB covers Muang Petchaburi, and the Cha Am - Hua Hin area, up to Muang Prachuap Khirikhan. The Central WSB is blessed with natural amenities, though water resources are limited in this subdivision. The Lower WSB covers Bang Saphan, Pathiu airport, and the major part of Chumphon province. The Lower WSB has potential for both industrial and agricultural development.

(3) Macro-Zoning for WSB Development

In view of the elements of the spatial development framework and the subdivision of the region, a macro-zoning scheme for the WSB has been formulated for the purposes of long-term planning. Several areas in the region have been defined and characterized by typical economic activities expected to be developed in the areas, as well as by opportunities to be made available for social and human development. In principle, each zone is identified by major urban centers within the zone, but agricultural and social activities in their rural hinterlands are also reflected in the characterization.

- (Ia) Kanchanaburi Eco-Tourism and Agro-Industrial Zone
- (a) Major urban center: Kanchanaburi
 - (b) Characteristic activities: Eco-tourism, agro-processing industry, livestock (cattle fattening), upcountry vegetables
 - (c) Key infrastructure: Kanchanaburi-Tavoy corridor, tourism promotion infrastructure, livestock related facilities
- (Ib) Ban Pong Industrial/Distribution Zone
- (a) Major urban center: Ban Pong
 - (b) Characteristic activities: Distribution center, automobile parts, ceramics, suburban agriculture
 - (c) Key infrastructure: Crossroads of the north-south and east-west arteries, industrial/distribution center
- (Ic) Ratchaburi Administrative and Industrial Zone:
- (a) Major urban center: Ratchaburi
 - (b) Characteristic activities: Regional administrative center, power supply center, industries relocating from BMA
 - (c) Key infrastructure: Urban infrastructure, natural gas terminal and power station, direct road links with other provincial capitals
- (Id) Samut Songkhram Free Trade and Aquacultural Zone
- (a) Major urban center: Samut Songkhram
 - (b) Characteristic activities: Free trade area (FTA), retail/whole sales, aquaculture
 - (c) Key infrastructure: FTA facilities, high-grade urban infrastructure
- (Ie) Upper Petchaburi Industrial Zone
- (a) Major urban center: Khao Yoi
 - (b) Characteristic activities: Processing industry, agro-industry
 - (c) Key infrastructure: Fully equipped industrial estate and distribution center

- (II) Central WSB Amenity Zone
- (a) Major urban center: Petchaburi, Cha Am, Hua Hin, Prachuap Khirikhan
 - (b) Characteristic activities: Tourism/conference, research and development (R&D), educational/cultural center
 - (c) Key infrastructure: Tourism infrastructure, science city/park, conference facilities, center for telecommunications
- (IIIa) Bang Saphan Industrial Zone
- (a) Major urban center: Bang Saphan
 - (b) Characteristic activities: Heavy industry, power center, free trade area (FTA)
 - (c) Key infrastructure: Deep-sea port and industrial complex/estate, Bang Saphan, FTA
- (IIIb) Chumphon Agriculture and Distribution Zone
- (a) Major urban center: Chumphon
 - (b) Characteristic activities: Agriculture particularly fruit production, livestock, fisheries, and distribution center
 - (c) Key infrastructure: Regional airport at Pathiu, feeder port, east-west corridor, tropical fruit research center

The macro-zoning proposed above will be referred to in formulating the spatial framework for the development of each economic sector, including an agricultural spatial plan, an industrial spatial plan, a tourism spatial plan, and a trade development plan, as well as in formulating rural and urban spatial development plans.

(4) Spatial Development Structure

Based on the macro-zoning proposed above and the multiple access approach to be applied in preparing the WSB regional development plan, a spatial development structure has been formulated as explained below.

The Kanchanaburi Eco-Tourism and Agro-Industrial Zone (1a) has an axis for access to and from the BMA as well as to Myanmar via Three Pagoda Pass. If and when the Tavoy (Dawei)¹ - Kanchanaburi Corridor is opened, the zone would serve as a gateway to Myanmar and further to South Asia and the Middle East. The zone will not be industrialized, except for agro-processing industries; its ecological conditions will be preserved to the maximum extent. Eco-tourism and livestock (cattle fattening), as well as cultivation of vegetables and flowers for niche markets in the BMA, will be promoted in this zone.

The Ban Pong Industrial/Distribution Zone (1b) is located at the crossroads of the north-south and the east-west arteries, and at the point closest to the BMA. A distribution center would ideally be located in this zone. Since automobile-related industries have been traditionally developed in Ban Pong, the zone is proposed to be further developed for domestic market-oriented industries, including machinery, automobile parts, and the like.

The Ratchaburi Administration and Industrial Zone (1c) is located in the center of the Upper WSB and will serve as a growth pole in the subregion. The terminal of the natural gas pipeline from Myanmar will be in the zone, and gas-related industries such as IPP (Independent Power Producer) power plants will be developed. The extent of industrialization will depend on the feasibility of the location for downstream natural gas industries.

The Samut Songkhram Free Trade and Aquacultural Zone (1d) is proposed to utilize land previously used as shrimp fields and now mostly abandoned. A part of this area will be reserved for protection and rehabilitation of mangrove and for aquaculture (e.g., cockle farming, mud crab restocking). In another part of Samut Songkhram, it is proposed to promote a free trade area (FTA) where processing industry, warehouses, a retail/wholesale center, as well as a residential, exhibition, and sports complex, are envisaged. The proposed FTA would also promote decentralization away from the BMA.

The Upper Petchaburi Industrial Zone (1e) will be a relatively small area where an industrial estate could be developed near the junction of Routes 4 and 35. Indeed, construction of an industrial estate is underway. This zone, though located in Petchaburi province, will be involved in the Upper WSB subregion.

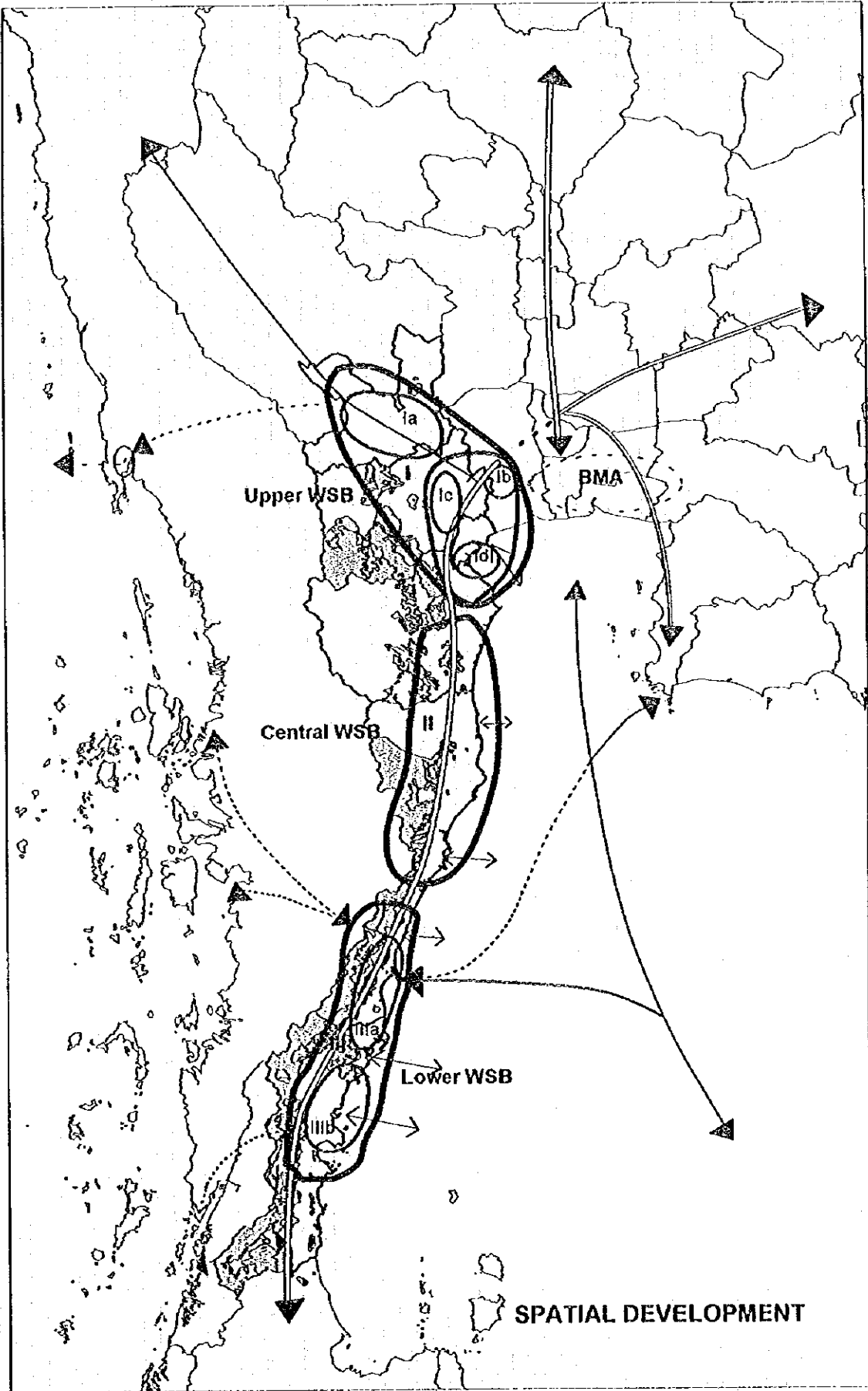
¹ Dawei is the name applied to Tavoy in Myanmar

The Central WSB Amenity Zone (II) is already serving as a tourism center (Cha Am and Hua Hin), and the ecological conditions in the zone should be preserved to the maximum extent. This zone include the three national parks (Khao Sam Roi Yot, Had Wanakorn, and Namtok Huai Yang) that situated to the north and south of Muang Prachuap Khirikhan. Since this zone is not to be totally preserved, it is proposed to locate a science city/park for technological research and development (knowledge-based industry and intellectual infrastructure) in the zone.

The Bang Saphan Industrial Zone (IIIa) will be developed with Bang Saphan deep-sea port as a key infrastructural component. A heavy industry complex and an industrial estate are being developed at Bang Saphan, and EGAT plans IPPs in and to the north of Bang Saphan. In the longer term, an east-west corridor might be opened to Myanmar.

The Chumphon Agriculture and Distribution Zone (IIIb) will have several points of access, including a regional airport at Pathiu, a feeder port at Chumphon, an east-west corridor between Chumphon and Ranong, and possibly a Myanmar (Marang) - Thai (Kraburi) link. The Chumphon area would serve as a distribution center of the WSB. This zone has potential for fruit production and livestock breeding, as well as for fisheries development.

The proposed spatial development structure is illustrated in the Figure on the following page.



3.5 Land Use Framework

The land use framework is elaborated through preparation of a map of current land use, evaluation of land development alternatives, and formulation of a land use plan.

(1) Current Land Use

Current land use in the Study area has been mapped out through remote sensing of satellite images and a GIS in the course of this Study, with a map scale of 1/250,000. The hectareage of current land use is summarized below.

Table 3.02 Current Land Use

	Kancha- naburi	Ratchaburi	Samut Songkhram	Petchaburi	Prachuap Khirikhan	Chumphon	WSB Region
Forest area	83.4	194.5	1.2	368.0	292.9	175.9	1,115.9
Paddy	42.6	57.5	2.1	35.1	21.5	26.5	185.3
Upland crops	117.6	249.8	11.5	194.7	185.5	273.2	1,032.3
Fruit & tree crops	18.5	14.2	13.0	6.9	123.0	88.6	264.2
Grassland and pasture	0.0	0.0	0.0	0.0	0.2	1.1	1.3
Water body/aquaculture	2.0	7.3	12.8	17.5	6.5	6.0	52.1
Others	4.9	4.2	0.5	4.5	3.7	1.8	19.6
Unclassified	0.1	0.1	0.0	1.0	1.2	0.9	3.3
WSB Region	269.1	527.6	41.1	627.7	634.5	574.0	2,674.0

The forest area consists of undisturbed evergreen and deciduous forests (covering 944,400 ha in 1996), disturbed forest (153,900 ha), and forest plantation (17,600 ha), corresponding to about 43 per cent of the Study Area which is much larger than the forest coverage at the national level (26.3 per cent). The forest coverage is especially high in Petchaburi province (59 per cent) and Prachuap Khirikhan province (46 per cent). Land for agricultural use accounts for nearly 55 per cent of the Study area or about 1.4 million ha. About 68 per cent of the agricultural land is used for cultivation of upland crops, while paddy fields are limited to 13 per cent of the agricultural land or 7 per cent of the total Study area. The proportion of paddy fields is lower in the WSB region than the national average (21.5 per cent).

When the current land use in the WSB region is compared with the available historical data, it is observed that the forest area has been reduced gradually though at a low rate in recent years, and that the grassland has been sharply reduced to a minimum level. The current land use map makes it clear that the expansion of cultivated land is no longer viable.

(2) Land Use Plan for Development and Conservation

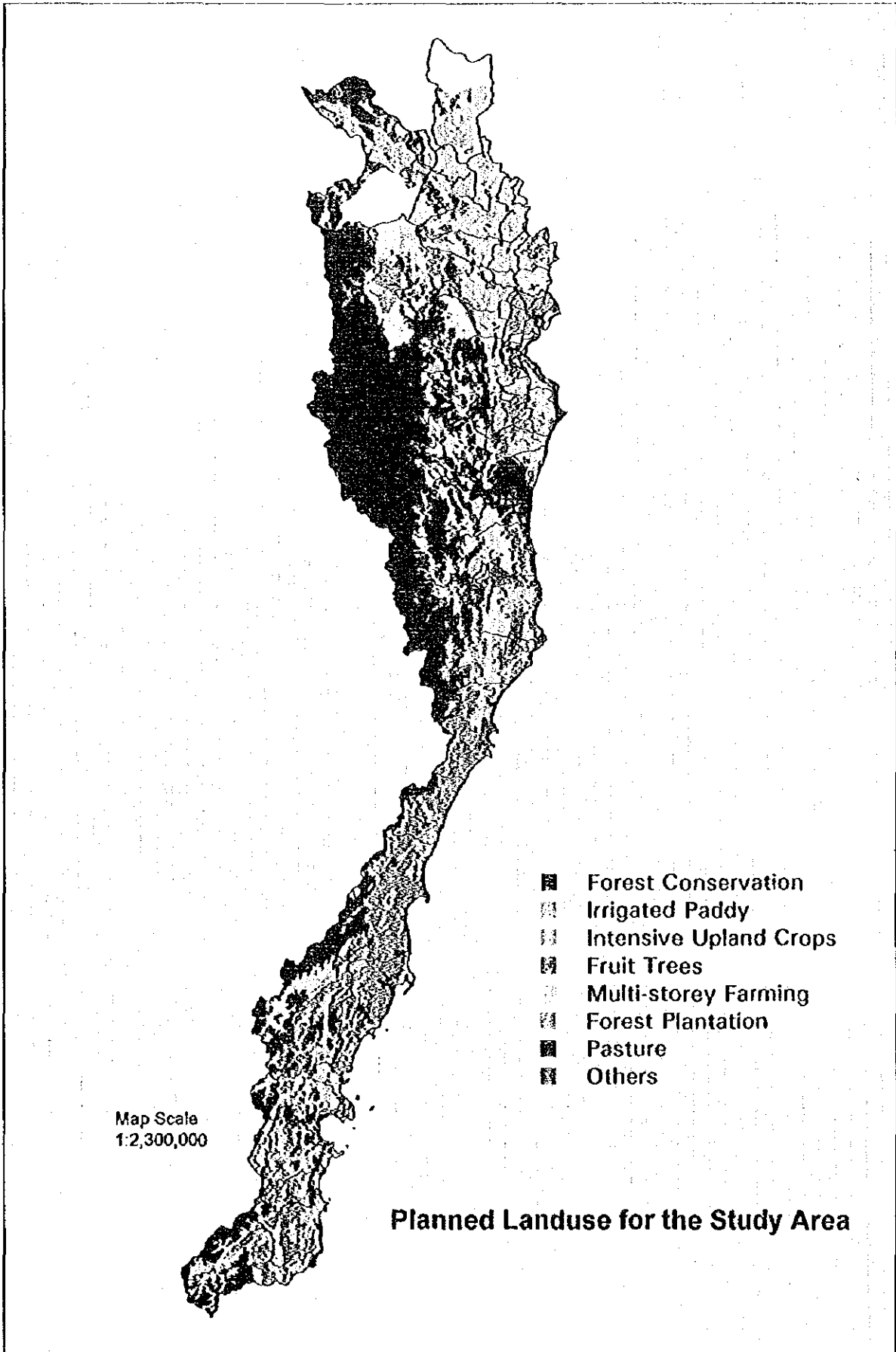
Various studies have been conducted for the planning of land use in the WSB region. Among them, a land use plan prepared by the Department of Land Development (DLD) of the Ministry of Agriculture and Co-operatives classifies land capability at the provincial level and is quite useful. For preparation of a land use plan in the WSB region, evaluation has been undertaken by various criteria, referring to the land use policy guidelines proposed by several institutions (e.g., DLD, TDRI, RFD, and DTCP), as well as to the general objectives of the WSB regional development plan. Major criteria proposed for the land use plan in this Study are summarized below.

- (i) The existing undisturbed forest areas shall be protected, irrespective of land use potential. Disturbed forest areas shall be rehabilitated and put to productive uses such as forest plantation.
- (ii) Of areas suitable for irrigated paddy, only such areas that are not used for tree crops at present will be devoted to irrigated paddy.
- (iii) The areas suitable for upland crops or rainfed paddy shall be used as much as possible for intensive upland crop cultivation.
- (iv) The areas suitable for fruit and other tree crops shall continue to be used for fruit and tree crops except for the existing sugar cane area and grass land to be converted to intensive upland crops.
- (v) The areas suitable for pasture shall be used for either managed pasture or forest plantation/reforestation.

The proposed land use plan elaborated through the above criteria is mapped out as illustrated on the following page. The hectarage of each land use in 2011 is proposed as tabulated below. The proposed land area for category of "others" is large enough to accommodate future urban and industrial areas.

Table 3.03 Land Use Plan

	Kancha-naburi	Ratchaburi	Samut Songkhram	Petchaburi	Prachaup Khirikhan	Chumphon	WSB Region (1,000 ha)
Forest conservation	57.1	184.9	1.0	347.2	204.3	136.5	931.0
Forest plantation	19.7	6.5	0.4	18.6	58.6	35.0	138.8
Irrigated Paddy	40.3	56.0	1.9	20.7	8.7	20.9	148.5
Intensive upland crops	98.6	144.9	0.3	80.9	87.9	67.7	480.3
Fruit & tree crops	0.6	41.1	22.7	25.5	174.7	137.7	402.3
Multi-story farming	23.4	73.1	0.5	62.1	52.1	123.9	335.1
Pasture	13.6	4.4	0.2	43.9	7.0	37.2	106.3
Others	15.8	16.7	14.1	28.8	41.2	15.1	131.7
WSB Region	269.1	527.6	41.1	627.7	634.5	574.0	2,674.0



Chapter 4 SOCIAL CONSIDERATIONS FOR REGIONAL DEVELOPMENT

4.1 Social Considerations

Since development of the WSB is planned to be socially-oriented, social considerations for development are discussed first to define the social development objectives and strategy and to identify programs for the social development of the WSB region. (Refer to Volume 2)

(1) Basic Considerations

"Thailand Vision 2020" and the 8th Economic and Social Development Plan put heavy emphasis on social policy concerns in future development. The adoption of a socially-oriented development plan is a challenging new direction taken for the development of Thailand. It should be recognized, however, that since social policy in Thailand is largely a national concern, it will limit what can be done within a regional development plan. It is cautioned that micro-management of social policy at the regional or local level is neither feasible nor desirable. It is impractical to believe that a purely social plan can be implemented for the WSB region. The best that regional-level planning can do is to create a favorable social environment within which individuals are left free to pursue their own social objectives, subject to constraints relating to the social costs of their actions.

With such a recognition, the regional development plan will not specify "social targets." The socially-oriented regional plan, however, will address social policies such as how to minimize (or equitably distribute) social costs and how to maximize (and distribute) social benefits from development. In other words, the socially-oriented development plan will be directed to achieving dual objectives relating to income (or output) and social amenities (e.g., family values, health, income distribution). Policies and programs for social development should be selected to create a socially acceptable living area, while attempting to minimize the associated social costs inherent in economic development, or at least equitably distribute social costs.

In promoting development of the region's social sector, the primary focus of social policy will be distribution, as opposed to allocation, as most social development

programs in practice mix more than one function. For instance, human capital investments such as education and health are made partially to improve the distribution of income opportunities but they are also undertaken to increase economic growth prospects. The WSB development programs and projects should therefore be directed toward *providing equitable access to services and amenities while attaining economic targets/policies for the production of the goods and services necessary for regional development.*

WSB residents recognize that significant changes have occurred in the past decades, socially and economically. These major changes, pointed out through this study's social perceptions interview survey, include improvement of public utilities and economic development. However, the survey results also suggest growing concerns about the social costs of development in the region, such as increases in land prices, the influx of immigrants, and degradation of the environment. Therefore, the development of the WSB's social sector should be oriented towards striking a balance between material progress and social concerns.

(2) Social Services and Their Constraints

The WSB region is at present a rather ordinary sort of area as compared with national averages of social indicators of the country. However, in the light of the distribution of income opportunities and in view of the extent of human capital investment in social amenities, the WSB region still faces considerable constraints in terms of promoting balanced regional development. To formulate objectives and strategies for the development of the WSB's social sector, some salient features of the current social situation are discussed below (with further details of these constraints presented in Volume 2, Chapter 2).

(i) The WSB region appears to have an adequate number of health facilities in total, though population per hospital bed is slightly below the national average. However, the WSB has only slightly more than one-half of the number of physicians per population compared to the national average (1:7,440 in the WSB vs. 1:4,300 in the Kingdom) and has over eight times the number of persons per physician as does the Bangkok area (1.915 in Bangkok).

(ii) The educational level of employed persons is low in the WSB region. About 60 per cent of those employed in the WSB have only completed lower elementary education (six years or less), compared with a national average of 54

per cent who have done so. Conversely, employment in the WSB is under-represented in terms of university-level education (2.8 per cent in the WSB vs. 5.1 per cent in the Kingdom). These differences reflect the relatively few facilities of higher learning in the WSB region.

(iii) In both public health and education, there is a "brain-drain" from the public sector to the private sector. For instance, teachers are being hired away from public schools by private industries. Physicians in the public hospitals are leaving to private clinics due mainly to the relatively low medical salaries in the public sector.

(iv) Household incomes in the WSB are relatively low, with more than 50 per cent of households earning less than 5,000 Baht per month. Assessments of household income and expenditures indicate that little saving is practiced in most households.

(v) Illiteracy rates among females are double those for males. Industrial and occupational segregation of women has resulted in women's earnings being about 20 per cent lower than those for men.

In view of the foregoing, social sector services and their constraints in the WSB region can be summarized as follows:

(i) The social constraints of the WSB region relate to the "quality," rather than quantity, of the social services. To attain balanced regional development, upgrading the quality of education, health, and other social services is of vital importance.

(ii) The WSB should have sufficient social amenities to keep residents in the region. At present, young persons seeking higher education and job opportunities often migrate to the BMA or elsewhere in the country.

(iii) Coordination between the public and private sectors should be promoted in the WSB region. For instance, skill development will largely be provided on the job so that the private sector will have to take the lead, while the public sector can effectively assist in the process by developing measures for testing and certification.

Another crucial constraint to be addressed in the WSB regional development plan is the shortage of labor in the region. The labor scarcity has three important implications: first, the need to substitute capital for labor (mechanization); second, likely growing pressures for in-migration; and third, the need to increase female participation in employment. In all cases, there is a strong need for skill upgrading for the work force. The most important requirement is a strong educational base -- a base that will provide workers with the knowledge how to solve problems and to learn on their own. Specific skills are best imparted on the job, however. Unfortunately, neither the educational nor training systems are currently well suited to meet this requirement.

Foreign migrant labor has additional social dimensions. It tends to increase social costs in the forms of higher incidence of certain diseases (e.g. HIV), higher medical costs, and some human and social frictions. It also tends to suppress wage levels and to increase pressure on existing social services and facilities.

Another constraint on regional development is that the residents and local administrators are not aware of the "social orientation" of the 8th Plan, though a sort of bottom-up approach has been taken for the first time in the economic and social development planning of the country. Local administrators are unaware of the "Thailand Vision 2020" either. As the 8th Plan and the Vision have emphasized, residents and local administrators should be positioned in the center of development. Further, it was also observed that in local administration there was not much consideration of assisting or supporting local residents or businesses in trying to improve local conditions. This is partly because most local authorities are appointed by the central Government and many of the civil servants view their jobs primarily in terms of administrative control, attempting to respond to the requirements of the central authorities. Administrative restructuring, including promotion of decentralization, will be required for social sector development as well.

4.2 Objectives and Strategy for WSB Social Development

4.2.1 Objectives for Social Development

Objectives for social development of the WSB have been established to attain the vision following the social development scenario presented in Section 3.1. The scenario for social development of the WSB considers the increasing number of in-migrants in a positive way to provide a wider range of opportunities for socio-cultural and human development rather than

to cause human and social friction. Social services and amenities in the WSB region should be improved to support more dynamic interactions between peoples of different backgrounds, including both original inhabitants and new in-migrants. Thus the first objective for the social development of the WSB may be expressed as follows:

- (i) To enhance levels of social services and amenities not only for local people but also for in-migrants and BMA residents.

The social development scenario for the WSB would be realized through a holistic approach, which would ensure the provision of opportunities for all related activities involved in realizing social and human development. The holistic approach, if carefully pursued, would allow cost-effective use of resources, thus putting the least pressure on the environment. The second objective expresses this aspect of WSB social development in the following way:

- (ii) To contribute to improving the living environment of the WSB region in a holistic way through the provision of opportunities for all the related activities involved in social and human development.

The WSB social development scenario would also be supported by a flexible system for development planning and administration involving local people/communities. The local people would be empowered through their involvement in the planning and implementation processes of various development activities. Representing this aspect, the third objective of WSB social development is expressed as follows:

- (iii) To empower local people by improving access to and diversifying opportunities for various socioeconomic activities and promoting a participatory approach to planning and implementation of social development.

4.2.2 Strategy for Social Development

The attainment of the social development objectives for the WSB will be supported not only by improved social services but also by economic development. In addition, a holistic approach would be adopted for social and human development encompassing all related socioeconomic activities, as described in Section 3.1. This approach would contribute also to minimizing environmental costs. Active involvement of the private sector is another condition to improve social services with limited public sector resources. Still another factor is local participation in line with the recent move toward decentralization. The strategy for

social development of the WSB is presented below covering these aspects: (1) economic development, (2) holistic approach, (3) private sector involvement, and (4) local participation with decentralization.

(1) Economic Development for Social Development

In general, social development should keep pace with economic development. Particularly in the WSB region, the job and wage opportunities available largely determine the social structure, and low incomes are at the root of most social problems. The types of jobs to be made available in the WSB region will determine not only the macroeconomic environment in the region but also the type and intensity of social problems to be faced by individuals. Thus balanced socioeconomic development would be particularly important for WSB regional development.

Such a consideration is particularly relevant to gender-related issues. Development of the WSB region will create more serious labor shortages, and employment opportunities for women will increase. This result should be taken in a positive way from a social development point of view. Increased participation of women in the labor force is not only a necessary condition for the WSB growth scenarios, but more importantly an essential part of the social development of the region.

(2) Holistic Approach to Social Development

As described in Section 3.1, a holistic approach would ensure that opportunities would be available for all the interrelated activities contributing to social and human development. It would support interactions of related activities to realize more than the sum of the effects of all the activities. The holistic approach represents the cost-effective use of resources, contributing also to minimizing environmental problems --- one of the major social costs.

(3) Active Private Sector Involvement in Social Services

Resources to address social problems are available in the private (non-governmental) sector, e.g., private hospitals, private schools, private foundations, private businesses, and best of all, private citizens. A number of ideas are conceivable. For instance, (i) the private sector could form partnerships with local community colleges utilizing a Skills Development Fund; (ii) a community college could work with an NGO to develop a plan for environmental protection; (iii) through credit unions, local residents could contribute to a fund to take care of poor families in rural areas; (iv) volunteers could work in health clinics in rural areas; and

(v) sister schools could be created within the WSB and some foreign countries, e.g., through the Internet. Promotion of private-public partnerships will be essential for the prosperity of the WSB region.

(4) Local Participation and Decentralization

Decentralization of decision authority from the national to regional/local levels and promotion of central-regional partnership is desirable on the grounds of increasing the general efficiency of governance and promoting social sector development and regional prosperity. "Empowerment of the people," which is one of the key targets of the 8th Plan, is not really possible without decentralization. An attempt could be made to implement a controlled experiment in decentralization for implementation of the WSB regional development plan. Thai people are known as highly adaptable, and they would adjust themselves to decentralization. However, shifts in authority to local levels can create special problems. Corruption, in particular, seems discernibly more prevalent in local areas and countersteps should be taken to prevent such associated social costs.

Along with decentralization, community participation should be promoted in the provision of various social services. For instance, community participation in primary health care can be readily increased. As another example, a community college may work with an NGO to develop a plan for environmental protection.

4.3 Measures to be Considered for Social Development

There are a number of reforms being considered under the 8th Plan, which are broadly in line with the directions indicated by the WSB social development objectives and strategy. The reforms under consideration in the education sector include (i) raising of the compulsory school attendance age from six to nine years, (ii) reform of entrance examinations to upper secondary and university levels, (iii) curriculum revision in general and emphasis on science and engineering in particular, (iv) teacher training, (v) experimental schools, and (vi) loans for the poor to enable them to attend private schools. These reforms will generally expand opportunities for education at different levels, and promote linkages between education and economic development.

In the health sector, reforms under consideration include: (i) upgrading the number and quality of health service personnel, (ii) upgrading the provision of health services at all administrative levels, (iii) development of voluntary and compulsory health insurance systems, (iv) increased community participation in primary health care, and (v) emphasis on

improving occupational and environmental health. These reforms will contribute to helping people prepare better for job and wage opportunities, and promote participation and awareness of health conditions and services.

To achieve specific objectives for WSB social development, measures should be further taken during the 8th, 9th, and 10th Plan periods. Recommended measures will include:

Social Environment

- Since WSB development will involve significant changes and reforms in society, resulting social changes should be monitored and evaluated regularly to maximize social benefits and minimize social costs, as well as to motivate local people to become actors of regional development. It is recommended that regular and institutionalized monitoring and evaluation system be set up by NESDB (Project SS1).
- For more effective social development, the existing local governance system should be improved at the provincial and tambon levels. It is recommended that measures be taken to improve channels of communications between local residents and provincial/tambon officials for promotion of local-central partnerships and to promote local participation institutionalized with TAOs (Project SS2).
- Since WSB development would be supported by more substantive roles of the private sector in all phases of development, it is recommended to encourage private business and individuals to participate in the provision of some social services and amenities and to promote private-public partnerships. This may be accomplished through citizen oversight boards, direct private sector contributions, and subcontracting to local service providers or to NGOs (Project SS3).

Education and Skills Development

- The reforms in the education sector under discussion at the national level should be introduced first in the WSB region. In particular, experimental schools should be established either newly or capitalizing on existing schools, and curriculum revision should be undertaken with emphasis on science and technology. It is recommended that two secondary schools be initially designated as experimental schools in the WSB to upgrade the teaching of science and technology (Project ED1).
- The WSB presently has no single university. To expand the regional ability of university education for development of intellectual infrastructure, thereby reducing

pressures for out-migration of students, it is recommended to set up at least two universities in the WSB. One of them may be the existing Rajabhat Institute, Petchaburi. Another university specializing in science and technology may be designated (Project ED2).

- To enhance human capital to support to be accelerated industrialization envisaged in the WSB, market-responsive skills training should be further promoted. It is recommended that industry-based training centers be set up in major industrial estates, making use of the readily available Skills Development Fund (Project ED3).
- Computerization is yet less developed in the WSB region. To prepare for the forthcoming age with computer-based information exchanges and Internet linkages, it is recommended to expand computer availability at schools, institutions, hospitals, libraries, and other public facilities as intellectual infrastructure (Project ED4). Internet linkages at the Rajabhat Institute, Petchaburi are encouraging in this respect.
- The WSB has one regional Non-Formal Education (NFE) center and six provincial NFE centers. Since the quality of NFE programs at these centers is quite low, it is recommended that measures be taken to improve and upgrade NFE activities and management.

Public Health

- The WSB region already has an adequate number of public hospitals, but actually faces a severe shortage of health personnel. The "brain-drain" is an urgent concern due to the wide income disparity between public and private hospitals. To promote coordination and a network between the public and private sector and to upgrade medical research capability, it is recommended to set up a medical research laboratory with hospital in the proposed Science City (Project PH1). The research hospital may attract more qualified health personnel to the region.
- The prevalence of industrial injuries and occupational diseases will rapidly increase with accelerated industrialization in the WSB. The experience of the ESB should be learned to safeguard people's health and establish better working conditions. In this context, it is recommended to set up a regional occupational health center that will serve for providing treatment and disseminating adequate information in the WSB (Project PH2).

- Traffic accidents are among the three leading causes of death in the WSB. Although the number of fatalities is forecast to increase, emergency medical services are not sufficient. Equipment in the emergency room and ambulances should be upgraded, and the emergency medical system should be reorganized to provide quick first aid (Project PH3).

- The WSB is one of the most critical regions in the HIV epidemic and the number of AIDS cases is forecast to increase partly due to the large number of poorly educated in-migrants. Integrated HIV/AIDS control is recommended to include health education for high-risk occupational groups, including foreign migrant labor, as well as a training program for village health volunteers to strengthen community-based care (Project PH4).

- Health development must encourage public participation so that they can solve health problems by themselves. Community participation is limited though the Government has implemented many health education programs. Health promotion programs should be upgraded to empower people's self-reliance utilizing the limited health resources in the region (Project PH5). Involvement of NGOs may be useful.

- Improvement of hospital management is also a critical issue in the whole Kingdom. Since most public hospitals suffer from budgetary shortages, the efficiency and quality of hospital management should be increased. Likewise, the oversupply of health resources by private hospitals should be controlled adequately.

- The health manpower development system should be improved to strengthen the provision and quality of health personnel. Priority should be put on underserved areas, like the WSB, to guarantee equal access to health services. It is recommended to upgrade the training program for teachers in medical schools and to provide more technical training for health personnel.

Chapter 5 RURAL AND URBAN DEVELOPMENT

5.1 *Rural Development*

Since the WSB region is predominantly rural and socially-oriented regional development is planned, rural development will play a significant role in the social and economic development of the WSB region. Approaches to rural development are discussed, and programs are proposed for rural development in the WSB region (Refer to Volume 5, Chapter 1).

5.1.1 Objectives and Strategy

(1) Present Situation and Prospects

The rural population in the region accounted for 70.9 per cent of the total WSB population in 1985, which was reduced only slightly to 69.3 per cent by 1995. Accelerated urbanization, however, is inevitable as envisioned by the WSB development scenario and projected by the macro framework for this Study. As urbanization proceeds, income distribution tends to worsen and various social problems emerge or are aggravated.

Levels of various social services in the WSB region are generally comparable to the national averages. At present, levels in the WSB seem reasonable as far as average levels are concerned, but there are some serious problems (e.g., poverty pockets). Provision of social services is expected to be consistently improved, in line with economic development.

In the WSB region many social problems are associated with jobs. In particular, job opportunities largely determine incomes, and low incomes are at the root of most social problems, including weakening ties among family members due to job-seeking out-migration.

A main exception here may be the gender issue. The poverty of female-headed households is just one of a number of gender-related social problems. Other concerns related to gender include possible social constraints on increased participation of women in the labor force, limited educational opportunities for women especially at higher levels, and the lack of social recognition for women as main actors in the participatory provision of social services (e.g., participatory health care).

(2) Objectives and Strategy

Rural development of the WSB region aims at solving social problems in dominant rural areas. Given the existing social conditions and limited resources in the WSB region as outlined above, a more focused approach will be necessary for WSB rural development.

First, most job and wage related social problems can be addressed more effectively through economic development. The WSB regional development plan attempts to create a wide range of job and wage opportunities in various fields including high-technology and specialized service jobs; these jobs will improve the macroeconomic environment and change the social structure in terms of the socioeconomic backgrounds of residents.

Second, the gender issue apart from the poverty issue of female-headed households would be better treated within the context of broader socioeconomic development. One important condition for the development of the WSB region is naturally to mainstream women for socioeconomic development, i.e., to have them participate as more significant contributors in the labor force and main actors in participatory social services.

Third, the poverty issue should be the focus of attention in WSB rural development. Poverty in rural areas, after all, is a primary outcome of various socioeconomic factors inherent in traditional rural communities.

Fourth, an issue-oriented approach may be taken to rural development corresponding to emerging opportunities for new economic activities. Rather than trying to solve or alleviate existing social problems associated with poverty, this approach would anticipate future problems that may be associated with new economic activities and try to minimize their social costs.

In general, two distinct approaches to the poverty issue in rural areas are conceived: a target group approach and a focused area approach. The target group approach attempts to solve problems faced by particular segments of society such as female-headed households, subsistence fisherfolk, and plantation workers. This approach may lead to formulation of a program to cover the target group in an extensive area (even the Kingdom as a whole), which may not be effective in solving the complex of problems in any small area.

The focused area approach may be more applicable to WSB rural development, since most social problems in the region are related to job and wage opportunities and this may be

addressed more effectively through economic development. Considering the extensive area of the WSB region, problem areas have been broadly identified representing typical problem complexes existing in the region. Pilot projects may then be formulated, one for each typical problem complex so that they may be replicated in other problem areas having similar problem complexes.

5.1.2 Problem Amphoes

(1) Problem Amphoes

The WSB region encompasses 45 amphoes and 451 tambons in six provinces. Updated socioeconomic data are available on an amphoe basis (1995 statistics) related to population, household income, education, health conditions, and various social infrastructure and services. Updated data on a tambon basis are available only for population statistics.

Amphoes in the WSB region have been classified into three to five groups by selected indices. Comparison of the amphoe classifications has revealed some correlations between classifications by different indices. In particular, ranking of amphoe by household income has a high correlation with ranking by indices related to the educational levels of residents. Also, amphoe classifications by access to clean drinking water and by availability of sanitary toilets are understandably highly correlated.

Problem amphoes have been selected by using two broad categories of indices: income/education and water/sanitation. Specifically included in each category are the average annual household income and the percentage of children having completed secondary education in the first category, and the ratio of households with clean drinking water and the ratio of households with sanitary toilets in the second category. Through classification of amphoes by each index, the following five amphoes have been selected for further analysis:

- (1) King Amphoe Dan Makhan Tia (Kanchanaburi province);
- (2) King Amphoe Nong Ya Plong (Petchaburi province);
- (3) Amphoe Kui Buri (Prachuap Khirikhan province);
- (4) Amphoe Bang Saphan Noi (Prachuap Khirikhan province); and
- (5) Amphoe Lamae (Chumphon province).

Dan Makhan Tia has been selected as it is ranked the lowest by both of the income/education indices. Nong Ya Plong, Kui Buri, and Bang Saphan Noi have low rankings by both the income/education indices and the water/sanitation indices. Lamae has been selected as it is

ranked the lowest by both of the water/sanitation indices, although it is ranked in the middle by the income/education indices. As a whole, these amphoes confront typical combinations of problems observed in the WSB region as far as aspects represented by these indices are concerned.

(2) Amphoes Facing Emerging Economic Opportunities

Various new economic opportunities are emerging in different parts of the WSB region, which may involve social problems and conflicts. Typical problems include conflicts over land use for urban/industrial and rural/agricultural uses, environmental problems associated with the proposed natural gas pipeline and industrial development, and social conflicts between in-migrant workers and local people.

Some of the problems may be confined to particular localities: e.g., conflicts between the natural gas pipeline and environmental conservation/eco-tourism, and pollution problems associated with the Bang Saphan industrial complex. These problems would better be addressed individually by formulating specific projects.

Other problems, especially those associated with intensification of agricultural land use, may have more extensive effects. Typically, enhancement of productivity of irrigated agriculture in the Mae Klong river basin and intensification of fruit cultivation and livestock development in the Lower WSB need to be carefully planned so that they will benefit local people the most with minimum social costs. The following two amphoes have been identified as representative rural areas facing these problems:

- (1) Amphoe Phanom Thuan (Kanchanaburi province), and
- (2) Amphoe Thung Tako (Chumphon province).

5.1.3 Recommended Pilot Projects for Rural Development

Rural development projects are usually small and complement large-scale infrastructure and economic development projects that would transform the socioeconomic and spatial structure of any region. Rural projects are implemented in many communities, usually one after another. Lessons can be learned from early implementation and reflected in the formulation and implementation of subsequent projects. Those projects to be implemented earlier should serve as pilot projects, which would be replicable, to varying degrees, in other communities.

Seven amphoes have been selected in the WSB region for early implementation of rural development projects (Project RD1). Five represent problem amphoes of different types facing poverty and associated social problems. The remaining two are expected to undergo significant social changes as a result of planned economic activities covering a large area. Pilot projects for these amphoes would indicate how similar projects might be formulated and implemented in other communities facing similar problems or opportunities.

(1) Pilot Projects for Problem Amphoes

Pilot projects have been formulated for the five selected amphoes facing typical poverty and other social problems. They are Dan Makham Tia (Kanchanaburi), Nong Ya Plong (Petchaburi), Kui Buri (Prachuap Khirikhan), Bang Saphan Noi (Prachuap Khirikhan), and Lamae (Chumphon). A common objective of these projects is to improve the livelihood of people in tambons of respective amphoes by introducing/diversifying economic activities.

Characteristic activities that may be promising in these amphoes include cattle raising in Dan Makham Tia, multi-story and integrated organic farming and social forestry in Nong Ya Plong, irrigated paddy and fruit tree and shrimp farms in Kui Buri, integrated farming, coastal fishery vitalization, and community resort development in Bang Saphan Noi, and fruit-based multi-story farming and dairy farming in Lamae. Different combinations of infrastructure will be provided to support these and other economic activities such as water supply, rural roads, marketing facilities, artificial reefs, and irrigation facilities. Also important is institutional support including the organizing of farmers, agricultural extension, and community rights for resource use. Profiles of the pilot projects are contained in Volume 5.

(2) Pilot Projects for Amphoes with Emerging Economic Opportunities

Pilot projects have been formulated for two selected amphoes: Phanom Thuan (Kanchanaburi) and Thung Tako (Chumphon). Emerging economic opportunities in Phanom Thuan are related to intensification of irrigated agriculture not only for paddy but also for vegetables, flowers, and other upland and tree crops and diversification of crops in favor of high value-added crops and those to be processed locally. A critical factor for the success of the project is improved water use and management and land consolidation. Organizing farmers is a prerequisite for these as well as joint procurement of various inputs and marketing.

Emerging economic opportunities in Thung Tako are related mainly to expansion and intensification of fruit production. Thung Tako has an extensive area suited to fruit and other tree crops partly under irrigation. Intensive fruit production under supplemental irrigation is a relatively new farming practice. Farmers need to adapt themselves to the new system supported by extension services, provision of seedlings/saplings, joint procurement of inputs and marketing; hence, pilot implementation is recommended before full-scale implementation.

5.1.4 Institutional Measures for Rural Development

While the pilot projects formulated in the Master Plan Study are implemented, more rural development projects are expected to be formulated with local participation. Existing institutional arrangements need to be streamlined for more effective planning and implementation of rural development projects with more active local participation.

In Thailand, there exist both top-down and bottom-up planning mechanisms for rural development (Volume 10: Institutional Development). Future directions for improved rural development planning and implementation should be based on (i) further decentralization of development administration, and (ii) the newly established Tambon Administrative Organizations (TAOs). Rural development institutions need to be strengthened at the tambon level with broad guidance from the national institution for rural development and more active participation of local people and communities.

At present, the Tambon Council formulates and proposes a tambon development plan. A development committee of the Council supports project development through technical assistance. Mostly, however, the Tambon Council undertakes coordination, cooperation, and information dissemination for government projects.

Project initiation and development at the tambon level should be strengthened with active local participation. It would start with participatory rural appraisal (PRA). Through PRA villagers themselves assess existing conditions of livelihood and resource potentials. Critical problems facing villagers and their needs are identified. Characteristics/roles of each community should be determined by its people in accordance with their vision/aspiration rather than defined by governmental officials and experts. The PRA would be followed by a project development workshop. The workshop may be organized at the tambon level with the participation of villagers, stakeholders, officials of local administration, and NGOs active in the locality.

Based on the PRA and the workshop, a tambon rural development plan would be prepared with a tambon land use plan. Preparation of the tambon land use plan would require substantive input again from villagers as to areas to be allocated to particular crops and locations of key infrastructure facilities. The tambon rural development plan would also clarify implementation arrangements for formulated projects, including the role of NGOs.

5.2 Urban Development

The WSB region has at present a limited number of urban centers, which are all relatively small; urbanization has not been remarkable so far. However, with regional industrialization in the future, urbanization is expected to proceed more rapidly and the role of urban development will become more significant in the WSB region. (Refer to Volume 5, Chapter 2)

5.2.1 Objectives and Strategy

(1) Present Situation

The urban population (949,000 in 1995) accounts for 30.7 percent of the total population of the region, and it increased at an average annual rate of 1.9 per cent in 1985-90 and 2.1 per cent in 1990-95. The urban area in the WSB (about 1,300 km²) represents about 3 per cent of the total land area of the region, and the urban population density is relatively high in major urban centers (e.g., 8,628 persons/km² in Ban Pong, 6,273 persons/km² in Petchaburi, and 5,344 persons/km² in Ratchaburi in 1995).

Urban development in the WSB region has been somewhat delayed, primarily because no regional urban core has been developed as a cluster. Due to inadequacy of the decentralization policy and the local budgeting system, along with a lack of urban development guidelines, urbanization has been progressing rather disorderly in the WSB. Urban infrastructure and amenities are insufficient at present to promote orderly urban development in the WSB region.

(2) Objectives of Urban Development

In view of the current situation of urbanization and with reference to the social and economic development scenarios proposed for the WSB region, the objectives for urban development for this region are proposed as follows:

- (i) To develop selected urban cores to promote investment and to foster decentralization in administrative, economic, and social activities;
- (ii) To create a socially acceptable and attractive living area in urban zones and enhance the quality of social amenities and social services in urban areas (this objective will support the social sector development objectives, as well);
- (iii) To support such economic activities as agriculture, industry (including knowledge-based industry), tourism, and trade, and thereby ensure the creation of opportunities for better jobs and incomes for urban residents; and
- (iv) To promote a participatory approach for planning and implementation of urban development in the region, particularly at the local level.

These objectives are related and somewhat similar to the objectives for the social sector and rural development. They have been combined as common objectives to create attractive places to live in the WSB region.

(3) Strategy for Urban Development

To attain the objectives for urban development in the WSB region, several strategies are proposed, as set out below.

- (i) It would not be strategic to promote urban development in every urban center in the region. Rather, it is more practical to plan and develop certain core urban centers selectively in line with the proposed social and economic development projects.
- (ii) Combined efforts are required for both urban development and economic sector development. Roles of major urban centers should be defined in the light of development in various economic sectors in each zone.
- (iii) Amenities in local urban centers should be planned and implemented with greater public initiative and involvement. The development of local urban centers should be strategically promoted along with rural development.
- (iv) The provision of additional housing opportunities will become more important when industrialization accelerates in the region. A new system of

institutional and financial arrangements will be required to make opportunities available for housing in urban areas.

(v) Similar types of improvements in several urban centers should be integrated into a package of improvement programs and should be programmed for implementation on a regional basis.

5.2.2 Development Targets

(1) Projected Urban Population

On the basis of the economic development plans discussed in Chapter 6, particularly in the industrial sector, the urban population (in municipalities and sanitary districts) in the WSB region is projected to increase as tabulated below.

Table 5.01 Projected Urban Population

	(Thousand; %)			
	1995	2001	2006	2011
WSB Regional Population	3,091	3,060	3,234	3,433
Urban Population	949	1,200	1,400	1,725
Share of Urban Population	30.7%	39.2%	43.3%	50.2%

The above projections indicate that urbanization will be enhanced in the Upper and Lower WSB, and urbanization will be less notable in the Central WSB.

(2) Land for Urbanization

Based on the projected urban population in each subregion, the land to be allocated for urbanization is estimated as follows:

Table 5.02 Land for Urbanization

	(hectares)		
	2001	2006	2011
Land Demand (Urban Use)	3,030	5,430	9,320
Upper WSB	1,610	2,890	4,960
Central WSB	450	800	1,380
Lower WSB	970	1,740	2,980

In the Upper WSB, an urban cluster should be developed to support industrialization in and around the urban centers of Ratchaburi, Ban Pong, Samut Songkhram, and Khao Yoi. In the Lower WSB, an urban center should be newly developed in the Bang Saphan area, with the plan calling for an induced population of about 55,000 on about 410 ha.

5.2.3 Recommended Measures

Since urbanization will be accelerated in the WSB, coupled with industrialization in the region, various urban development plans and projects are recommended. The recommended actions and measures to be taken in the urban development sector will include the following:

- Several urban centers in the Upper WSB should be developed as a cluster. As a comprehensive urban development plan has not been worked out in this zone, it is recommended to review the existing land use plan and to formulate a cluster development plan (Project UD 1). It is also recommended that urban development guidelines be formulated including rules, regulations, and a comprehensive legal framework for urban development and city planning. (The proposed plan is further discussed in Volume 5, Appendix II to Chapter 2.)
- It is proposed to develop a Science City in Petchaburi to promote knowledge-based industry and intellectual infrastructure, as a "functional city" or a "center of excellence" in the WSB (Project UD 2). A number of research and development centers and laboratories will be located in the Science City, together with the universities. The proposed Science City will have a population in the order of 20,000 and will be located in the amenity zone in the Central WSB. (The proposed plan is further discussed in Volume 5, Appendix III to Chapter 2.)
- In the Lower WSB, a new industrial city is proposed in the Bang Saphan area for the projected area population of about 55,000 in 2011. Since the industrial complex is being accelerated in Bang Saphan, it is recommended that the land use plan be finalized by DTCP and the housing plan be implemented by NHA at the earliest possible date (Project UD 2).
- City plans have not been well prepared for the major existing urban centers in the WSB region, with the result that the cities are expanding in a disorderly fashion. Urban infrastructure, including urban transport, is not planned on the basis of such a city plan. It is therefore recommended that appropriate city plans for major urban centers be worked out by DTCP, together with basic plans for urban transport and the development of other infrastructure in the urban areas.

- Urban social infrastructure, particularly sewerage and solid waste disposal facilities, has not been yet developed in the six provincial capitals of the WSB. To make the urban centers more attractive places to live, it is recommended that sewerage systems be planned and implemented in line with the city plans to be formulated by DTCP. It is recommended that PWD and OEPP coordinate their activities in promoting the sewerage improvement plan for the region. Regarding solid waste disposal planning, it is recommended that a medium-scale compost be set up in the northern part of the amenity zone in the Central WSB (Project UD 3).

- To implement a socially-oriented regional development plan and to make urban life more attractive, a program approach should be applied for the planning and budgeting of improvements in urban amenities. It is recommended to work out a plan specifying what should be incorporated into the program and how each program element should be implemented in each province. Coordination should be maintained between the public and private sectors in the planning and implementation of urban amenities (Project UD 4).

- It is recommended that the Ministry of Interior study the reorganization and strengthening of the institutional framework for urban development, particularly considering that DTCP is in charge of urban planning but it is not responsible for the monitoring of urban and housing development nor for the implementation of urban development plans. One possible approach to strengthening the institutional setting would be to reorganize DTCP as a public corporation responsible not only for planning but also for implementation of urban and housing development projects (Project UD 5).

